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ABSTRACT

The instructional unit was developed for use as a guide for planning and teaching adult or young farmer classes in Kentucky. The unit consists of 12 lessons covering various aspects of soybean production and marketing. The course objective is to develop the effective ability of farmers to plan for profitable soybean production. Transparency and handout masters are included at the end of each lesson in the unit. (Author/VA)

SOYBEAN PRODUCTION AND MARKETING

ADULT 105

AN INSTRUCTIONAL UNIT for TEACHERS of ADULT VOCATIONAL EDUCATION in AGRICULTURE

ADULT CURRICULUM MATERIALS PROJECT
DEPARTMENT OF VOCATIONAL EDUCATION
COLLEGE OF EDUCATION
UNIVERSITY OF KENTUCKY
1979

SOYBEAN PRODUCTION AND MARKETING

An Instructional Unit for

Teachers of Adult Education in Agriculture

Developed by:

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Prepared by:

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1972

FOREWORD

Mr. Paul Irish, full-time teacher of adults in Daviess County, has conducted an outstanding program of education for farmers in west Kentucky for 24 years, 14 years as Veterans Program Instructor and 10 years in his present position. He holds a B.S. degree in agriculture from Berea College and has a Master of Science degree in agriculture from Western Kentucky State University.

Mr. Irish is highly qualified to deal with soybeans. The crop variety plots and other on-farm research which he instituted in Daviess County are widely known, and each year his variety test "stress wheels" draw visitors from throughout Kentucky as well as from other states.

This adult-farmer course is a result of the following sequence of actions:

1) The State Advisory Committee, made up of agriculture teachers, State staff, and teacher educators from throughout Kentucky, was organized to determine needs and program direction for adult work in agriculture for the State. A major outcome of the fitst meeting in September, 1971, was a recommendation that more instructional materials that are specifically designed for teaching adults in agriculture be developed and distributed to teachers.

2) Subsequently, a proposal to involve experienced teachers of adults in material development was written by Dr. Maynard Iverson of the University of Kentucky and submitted for State funding. In January, 1972, a two-year, $15,000 grant was made through the Supporting Services Division, Bureau of Vocational Education, State Department of Education.

3) Six teachers were selected to produce units in the diverse areas of need during the spring and summer of 1972. Mr. Irish's unit on Soybeans is a product of that project.

This publication, along with future materials developed specifically for the teaching of adults employed in agriculture in Kentucky, should improve the teaching of adult calsses in agriculture and stimulate the initiation of additional classes.

Robert L. Kelley, Director
Agribusiness Education
Bureau of Vocational Education
State Department of Education
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Professor and Chairman
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University of Kentucky
Lexington, Kentucky

ACKNOWLEDGEMENT

We are grateful to the following for their valuable assistance in completion of this unit: Dr. Frank A. Pattie, Professor Emeritus, University of Kentucky; Mrs. Anne Mills and Mrs. Mitzi Iverson, typists, University of Kentucky; Mr. Raymond Gilmore, artist, Curriculum Development Center, University of Kentucky; Dr. John Mathews, Director, Illinois Vocational Agriculture Service, for his permission and encouragement in adopting the Illinois unit to Kentucky; and especially to Mr. Billy Joe Miles, Rt. 3, Owensboro -- a leader in soybean farming whose work in evaluating new varieties and utilizing fertilizers and other chemical resources in production has served as a stimulus to the writer for learning and teaching more about the "Cinderella Crop," soybeans.

CONTENTS

SUGGESTIONS FOR USING THE UNIT

This publication was developed for use as a guide for teachers in planning and teaching adult and/or young farmer classes. It was adapted to Kentucky from an Illinois unit, "Modern Soybean Production". Although the unit was designed to be taught in 12 sessions, teachers are advised to select appropriate lessons and adapt the unit to their particular needs. It is recommended that class members be involved in the planning of the course. Planning forms are included in Appendix.

The format used was designed to assist teachers in utilizing problem-solving and the discussion method. A teaching procedure that has been used successfully is as follows: Step 1: The teacher lists the topic (problem and analysis) on the chalkboard. Step 2: He then sets the stage for discussion with introductory facts, ideas, or comments, using items from the section on "developing the situation". Step 3: The teacher calls on the class to give their experiences, ideas, and knowledge concerning the subject. The discussion is supplemented with handouts, transparencies, models, or other inputs gathered by the teacher beforehand to help solve the problem under consideration. Resource people or films may also be used here as sources of information. (Transparency and handout masters are found at the end of each lesson in the unit.) Step 4: When the facts have been brought out and a good discussion has taken place, the teacher leads the group to appropriate conclusions. These summary statements are written on the chalkboard and, in some cases, are typed up and distributed as handouts at the next meeting. Some instructors will utilize devices such as panels, exhibits and tours to reinforce the conclusions reached. Several suggestions for supplementary enrichment activities are listed in each lesson of this unit. Specific people knowledgeable in the field and who are willing to serve as resource personnel are suggested in the VoAg Directory of Resource People in Kentucky.

In addition to the subject matter packet which accompanies this unit, the Farm Quarterly publication, Modern Soybean Production should be secured by teachers planning to teach this unit. This book contains much in-depth information on soybean production presented in a very readable style.

Each teacher using the unit is asked to complete and return the evaluation questionnaire found in the Appendix. These ratings and suggestions will be used to improve future publications.

Best wishes for a successful adult program.

Paul Irish
Development Consultant

Maynard J. Iverson
Project Director

OBJECTIVES OF THE COURSE

Major objective: To develop the effective ability of farmers to produce and market soybeans profitably.

Lesson objectives: To develop the effective abilities of farmers to:

1. Plan for Soybean Production.
2. Understand How the Soybean Plant Develops.
3. Select Quality Seed.
4. Plan the Fertilizer Program.
5. Plant Soybeans.
6. Control Weeds in Soybeans.
7. Control Diseases of Soybeans.
8. Control Insects in Soybeans.
9. Harvest and Store Soybeans.
10. Market Soybeans.
11. Keep and Analyze Records of Production.
12. Utilize New Developments in Soybean Production.

UNIT REFERENCES

The references listed below should be helpful in technical "back-up" content when teaching a class on "Soybean Production and Marketing". It is suggested that teachers secure copies of any publications below which they do not already have in their library.

Some of the references cited are the latest editions of books and circulars. Teachers having older editions should examine them critically to determine if they are adequate.

BOOKS

Modern Soybean Production by Walter O. Scott and Samuel R. Aldrich (The Farm Quarterly, Cincinnati, Ohio) 1970. $10.00.

The Soybean by A. G. Norman (Academic Press, New York City, N.Y.) 1960. $8.95.

KENTUCKY PUBLICATIONS

Cooperative Extension Service

Certified Seed is Programed for Profit, Leaflet 320.
Chemical Control of Weeds in Farm Crops in Kentucky, Misc 113.
Controlling Soil Acidity, EC 584.
Cutting Fertilizer Costs, EC 599.
Fertilizer Facts for Kentucky, EC 624.
Growing Soybeans in Kentucky, Leaflet 17.
Insecticide Recommendations for Alfalfa, Clover, and Soybeans, Misc 279.
Kentucky Soybean Performance Test 1970, PR 191.
Lime and Fertilizer Recommendations, EC 619.
1970 No-Tillage Recommendations, Misc 382.
Nitrogen in Kentucky Soils, Sources, Fixation, Releases, EC 608.
No-Tillage Recommendations, Misc 382.
No-Tillage, Soil Moisture and Soil Temperature, PR 187.
Phosphorus in Kentucky Soils, Sources, Fixation, Releases, EC 602.
Potassium in Kentucky Soils, EC 622.
Production Potentials for Kentucky Agriculture, Misc 327.
Put a Stop to Insects in Stored Grain, Misc 387.
Recommended Crop Varieties for Kentucky, Misc 392.
Results of Kentucky Soybean Variety Performance and Row Width Test, PR 113.
Secondary & Micronutrient Element Needs for Field Crops in Kentucky, EC 613.
Seed Inspection in Kentucky 1963-1967, RB 199.
Soils Handbook, Misc 383.
The Occurrence of Soil Moisture Deficiency in Kentucky, B 706.
What is Certified Seed? Leaflet 188.

Others

Grain Drying Handbook, Department of Agricultural Engineering, University of Ky.
Grain Merchandising and Futures Markets in Kentucky, Series 7, University of Kentucky.
Kentucky Agricultural Statistics, (latest edition), James M. Koepper, 434 Post Office Building, Louisville, Kentucky 40202.
Kentucky Certified Soybean Seed, (Kentucky Seed Improvement Association, 929 South Limestone St., Lexington, Kentucky.).
No-Tillage Experiences in Kentucky, Paper 68-144, University of Kentucky, Lexington, Kentucky.

OUT-OF-STATE BULLETINS (IN PACKET)

Iowa State University, Coop. Ext. Service, Ames, Iowa.

How a Soybean Plant Develops, Special Report 53, November, 1967.
Profitable Soybean Production, PM 441, November, 1968.
Soybean Diseases, Pamphlet 528, April, 1972.
Soybean Yields Can Be Increased, Iowa Farm Science Vol. 21, FS-1209.

Chicago Board of Trade, Chicago, Illinois.

Soybean Futures.

Amchem Products, Ambler, Pennsylvania.

Modern Soybean Production.

Plant Food Review, National Plant Food Institute, Washington, D. C.

Status of Soybean Nodules.
What Is This Plant Called Soybeans?

U. S. Department of Agriculture, Washington, D. C.

The Soybean Cyst Nematode, PA 333.

University of Illinois, Vocational Agriculture Service, Urbana, Ill.

Approved Practices for Soybeans, four-page mimeograph, April, 1968.
Bioassay for Herbicide Residue, (Agronomy Facts W30), 1969.
Common Soybean Insects, Picture Sheet No. 6, April, 1968.
Custom Rates and Machinery Rental Rates for Illinois, FM 86, Dec., 1965.
Economics of Narrow-Row Culture, Paper No. 65-654, December, 1965.
Hybrid Soybeans in the Future, (Agronomy Facts S-13).

Illinois Agronomy Handbook, Circular 1049.
Insect Control for Field Crops, Circular 899.
Performance of Commercial Soybeans in Illinois, Circular 1046, 1971.
Recognizing and Reducing Herbicide Injury, (Agronomy Facts 31), March, 1969.
Soybeans -- Description of Varieties, (Illinois Crop Improvement Association, Urbana, Illinois).
Soybean Farming, (National Soybean Crop Improvement Council, Urbana, Ill.)
Soybean Fertility Studies, AG-1945, October, 1968.
Soybean Roadblocks, (Soybean News, National Soybean Crop Improvement Council, Urbana, Illinois).
When to Sell Corn, Soybeans, Oats, and Wheat, Circular 948.

University of Illinois, Vocational Agriculture Service, Urbana, Ill.

Growing Soybeans, VAS-4033.
Hunger Signs in Crops, VAS-4011a.
Innoculation of Legumes, VAS-4022.

SLIDEFILMS OR SLIDES

"A Systematic Approach to Weed Control," VAS-799, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).
"Calibrating Field Sprayers," VAS-442, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).
"Development of the Soybean Plant," (Iowa State University, Visual Instruction Service, Ames, Iowa).
"Factors Affecting Classes and Grades of Soybeans," VAS-746, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).
"Hedging," (Chicago Board of Trade, Chicago, Illinois).
"Recognizing Herbicide Injury," VAS-798, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).
"Soybean Diseases in Illinois," VAS-747, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).
"Using Pre-emergence Herbicides," VAS-797, (University of Illinois, Vocational Agriculture Service, Urbana, Illinois).

OTHER SUGGESTED REFERENCES

Grain Drying and Handling, MWPS 13, Purdue University, Lafayette, Indiana, $1.00.
"Hedging Highlights," Chicago Board of Trade.
"Marketing Grain Through a Grain Exchange," Chicago Board of Trade.
Monsanto Herbicide Handbook, Vol. I.
Quick Reference for Grass and Weed Control, Dow Chemical Co.
The Stauffer Weeders No. 2, Stauffer Chemical Co.

PERIODICALS

Crops and Soils Magazine, (677 South Segoe Road, Madison, Wisconsin 53711).
Delta Farm Press, (Clarksdale, Mississippi 38614). Weekly Publication, $10 per year.
Kentucky Farmer.
Potash Institute Newsletter, (Potash Institute of North American, 1649 Tullie Circle NE, Atlanta, Georgia 30324).
Progressive Farmer.
Soybean Digest, (Hudson, Iowa 50643).
The Farm Quarterly/Crops '72, (222 East Central Parkway, Cincinnati, Ohio 45202).

NOTE: The subject matter packet on Modern Soybean Production included with the unit was secured from Vocational Agriculture Service, University of Illinois at Urbana-Champaign, 434 Mumford Hall, Urbana, Illinois, 61801.

INTRODUCTORY MATERIAL

It was during the late nineteenth century that attention was first given to the soybean as a crop in the United States. Since that time there has been rapid expansion in soybean production, particularly in the past 30 years. Most of the soybeans were grown in the South prior to the 1920's. Soybean sales now bring farmers about three billion dollars a year.

Presently, the United States produces 75 per cent of the world's supply of soybeans, exports 90 per cent of the world's trade in soybeans, and uses 50 per cent of the domestic crop in the export trade.

The ten leading soybean producing states as of 1968 were as follows:

State	Average Yield/Ac.	Production Million Bushels
1. Illinois	31.5	204.4
2. Iowa	32.0	179.9
3. Missouri	28.0	100.6
4. Indiana	31.5	95.8
5. Arkansas	21.5	85.7
6. Minnesota	22.0	70.3
7. Ohio	30.0	68.3
8. Mississippi	26.0	55.1
9. Louisiana	26.0	37.3
10. Tennessee	21.0	25.0
11. KENTUCKY	27.5 (1968-70 average)	15.0

Soybeans are the third most important cash-grain crop sold by Kentucky farmers. Based on the rate of $2.85 per bushel, Kentucky soybeans could be estimated as a value of 42 million dollars. New, high-yielding varieties, herbicides, narrow rows and increased use of fertilizer in the cropping system have boosted potential soybean yields much higher than the state average. Higher yields and increased profits can be realized in most areas by adopting modern practices in soybean production. Higher yields are essential to cover increasing input cost.

The rapid growth of the soybean crop has been matched by the expansion of the soybean processing industry. Soybeans are used mainly for oil and meal. Most of the oil is used in human foods, primarily in margarine, shortening, cooking oils, and salad dressing. Almost 100 per cent of the meal consumed in the United States comes back to the farm, usually in the form of mixed feeds. The products derived from soybeans are high in protein and are in popular demand, both domestically and in foreign countries.

The phenomenal growth in production of soybeans and the gap between present yields and potential yields indicate the need for studying "Soybean Production and Marketing".

Lesson 1

PLANNING FOR PROFITABLE SOYBEAN PRODUCTION

Objective -- To develop the effective ability of farmers to plan for profitable soybean production in Kentucky.

Problem and Analysis -- How should we plan for high profit soybean production?

-Identifying present production practices
-Establishing yield goals
-Analyzing production trends
-Determining problem areas

Content Information

I. Soybeans rank number 2 in the U.S. and third in Kentucky in cash crops. The world's outstanding need for protein in human foods and livestock feeding has created a very favorable market for soybeans in the 1970's. The U.S. produces 75 per cent of the world's supply of soybeans, exports 90 per cent of the trade, and starting in the 70's, will send 50 per cent of the domestic production into the export trade.

II. Realistic soybean goals are planned, not hoped for. A realistic soybean yield goal would be to shoot for 5 or 10 bushels higher than yields achieved in past years. Changing one practice does not always produce a significant yield increase. Changing one practice directly and indirectly affects most other factors. In planning realistic goals the following factors need to be considered:

A. The soil and its potential.

B. Current production practices.

C. Soil moisture reserve.

D. Management ability.

E. Willingness to do things on time.

III. Soybeans have been considered a "secondary" crop on most Kentucky farms until recently when markets and technology have made "beans" a primary enterprise. It can be seen that soybeans would probably net more return at 50 bushels per acre and $3.00 per bushel than corn at 150 bushel per acre and $1.00 per bushel.

The advantage herein is that beans have one-third the hauling and handling. Also, soybeans are adaptable to equipment and storage that is used in corn production. Because of these advantages soybeans are replacing corn at an increasing rate on Kentucky farms.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Soybean acreage in the community (county) compared with other crops and previous years.
2. Annual production of soybeans: national, state, county. (Bushels, yield per acre, value.)
3. Factors to be considered in establishing a yield goal.
4. Some likely problem areas.

B. Things to be secured from class members:
1. Acreage on enrollees' farms compared with other crops/years.
2. Advantages of producing soybeans.
3. Production of soybeans on enrollees' farms (bushels, yield, value).
4. Expected yields in the community; their personal goals.
5. Information needed for attaining yield goals.
6. Problems likely to be encountered in changing production practices.
7. Problem areas to be studied.

II. Conclusions

A. Look to your present practices for areas needing change; watch the effect of any change in one practice on other practices.

B. Aim for a five to ten bushel increase in present yields. Set a reasonable goal and work toward it.

C. Look at your progress with soybeans during the past three to four years. Your production must pay for machinery, land, and labor costs or you must make some adjustments.

D. Soil potential, management ability of farmers and local situational factors determine major emphasis (areas of need) for further study. To improve these situations, plan the work and work the plan.

III. Enrichment Activities

A. Using the data collected concerning acreage and yields, have each individual develop realistic goals for soybean production in the community.

B. After goals have been identified, ask those enrolled to indicate what problems will be encountered in achieving the goals and objectives. Re-evaluate goals in terms of varieties, weed control, seed bed, disease and insects, fertility and the many other considerations of successful soybean production.

C. List the problems raised by individuals in the class. Incorporate the problems into appropriate problem areas.

D. Decide on a tentative order in which the problem areas will be studied. A committee should be utilized to assist with detailed planning.

IV. Suggested Teaching Materials

A. References

1. In packet
   a. Soybean Yields Can Be Increased, Iowa publication, FS-1209.
   b. Profitable Soybean Production, Iowa publication, PM-441.
   c. Modern Soybean Production, Amchem Products, Inc.
   d. Soybean Farming, National Soybean Crop Improvement Council.
   e. Soybean Roadblocks, National Soybean Crop Improvement Council.
   f. Approved Practices for Soybeans, Illinois VAS.
2. Additional references
   a. Standards for Measures of Efficiency, Illinois VAS.
   b. Production Potentials for Kentucky Agriculture, Kentucky Misc 327.
   c. Growing Soybeans in Kentucky, Kentucky Leaflet 17.
   d. Kentucky Agricultural Statistics, (latest edition).
   e. Farm Planning Manual for Kentucky Farmers by Allen and Browning, pp. 31, 33.

B. Audio-visuals

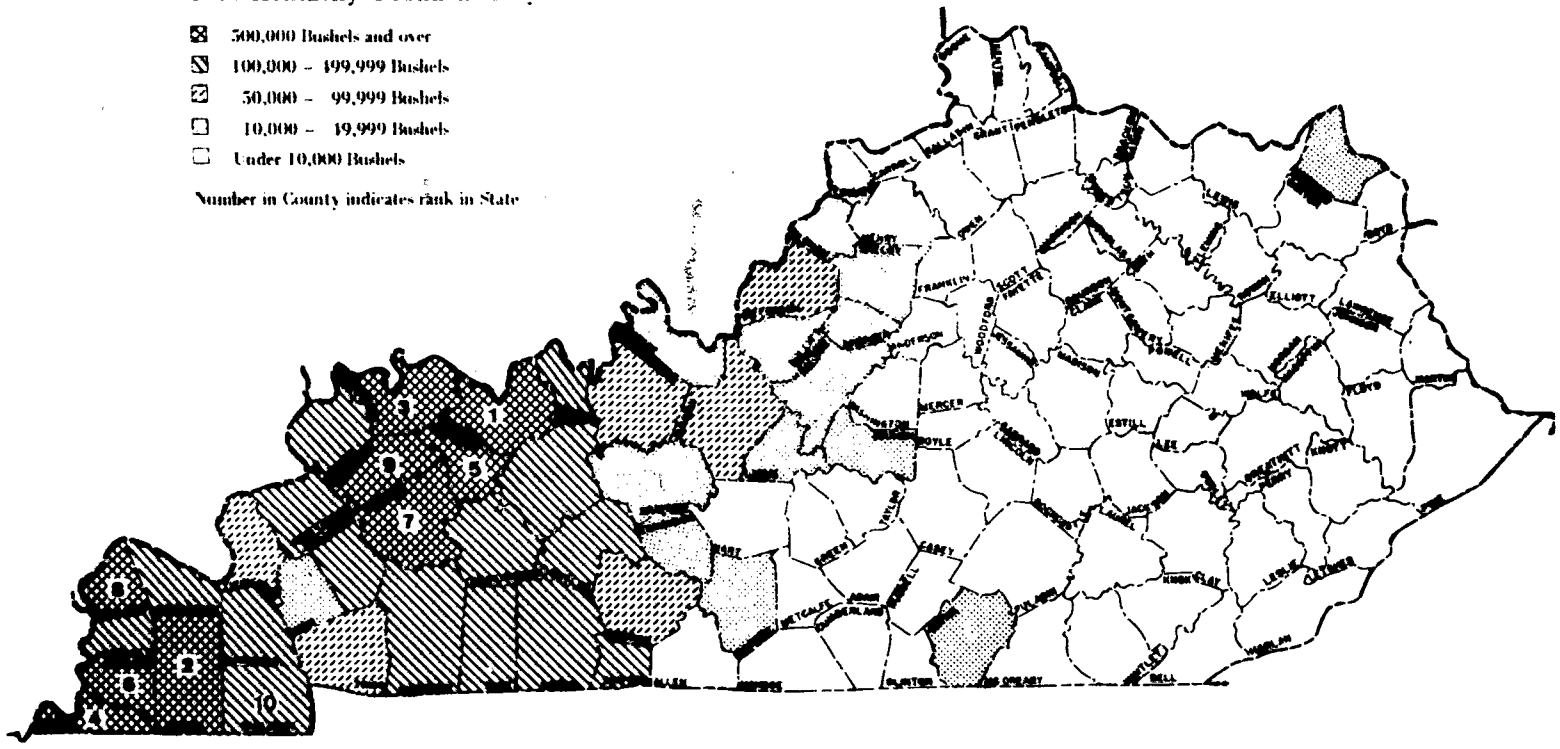
1. Masters*
   -1 Soybeans for Beans...(Production map).
   -2 Cost and Returns for Soybeans in Kentucky (chart).

*Masters are keyed to the unit and lessons, and are numbered consecutively. The code number appears in the lower right-hand corner of each master. Master "Adult 105-1-2" indicates: adult unit number 105, lesson 1, item 2.

SOYBEANS FOR BEANS:
1970 Kentucky Production By Counties

- 500,000 Bushels and over
- 100,000 – 499,999 Bushels
- 50,000 – 99,999 Bushels
- 10,000 – 49,999 Bushels
- Under 10,000 Bushels

Number in County indicates rank in State



SOURCE: 1971 Agricultural Statistics, p. 33

COST AND RETURNS FOR SOYBEANS IN KENTUCKY

Conventional			Double Crop
	Soybeans		
Expected Returns	40 bu @ $2.50=	$100.00	Expected Returns
Total		$100.00	Total
Cost Items			Cost Items
Cash Costs --			Cash Costs --
Fertilizer & Lime		$ 10.00	Fertilizer & Lime
Seed		3.50	Seed
Chemicals		6.00	Machinery Operation
Machinery Operation		6.00	Chemicals
Total		$ 25.50	Total
Overhead Costs			Overhead Costs
Depreciation --			Depreciation --
Machinery & Equipment		$ 8.00	Machinery & Equipment
Storage Facilities		2.00	Storage Facilities
Interest			Interest
Machinery & Equipment		3.20	Machinery & Equipment
Storage Facilties		1.60	Storage Facilties
Land		20.00	Land
Taxes		3.00	Taxes
Total		$ 37.80	Total
Labor (20 Hours)	(5 Hours)	7.50	Labor (7 Hours)
Total All Costs		$ 70.80	Total All Costs
Capital Investment			Capital Investment
Land		$400.00	Land
Machinery & Equipment		80.00	Machinery & Equipment
Storage Facilities		40.00	Storage Facilities
Total		$520.00	Total
Net (Profit)		$ 29.20	Net (Profit)

SOURCE: Farm Planning Manual, Dept. of Ag. Econ., U.K. pp. 31, 33. ADULT 105-1-2

COST AND RETURNS FOR SOYBEANS IN KENTUCKY

Conventional			Double Cropping	
	Soybeans			Wheat/Soybeans
rns	40 bu @ $2.50= $100.00	Expected Returns	40 bu wheat @ $1.50= $60.00 40 bu beans @ $2.50= $100.00	
	$100.00	Total		$160.00
		Cost Items		
		Cash Costs --		
& Lime	$ 10.00	Fertilizer & Lime		$ 15.00
	3.50	Seed		9.50
	6.00	Machinery Operation		10.00
Operation	6.00	Chemicals		6.00
Total	$ 25.50	Total		$ 40.50
		Overhead Costs		
--		Depreciation --		
& Equipment	$ 8.00	Machinery & Equipment		$ 11.00
cilities	2.00	Storage Facilities		4.00
		Interest		
& Equipment	3.20	Machinery & Equipment		4.40
cilties	1.60	Storage Facilties		3.20
	20.00	Land		20.00
	3.00	Taxes		3.10
Total	$ 37.80	Total		$ 45.70
s) (5 Hours)	7.50	Labor (7 Hours)		10.50
s	$ 70.80	Total All Costs		$ 96.70
ment		Capital Investment		
	$400.00	Land		$400.00
Equipment	80.00	Machinery & Equipment		110.00
ities	40.00	Storage Facilities		80.00
Total	$520.00	Total		$590.00
	$ 29.20	Net (Profit)		$ 63.30

Planning Manual, Dept. of Ag. Econ., U.K. pp. 31, 33. ADULT 105-1-2

Lesson 2

UNDERSTANDING SOYBEAN PLANT DEVELOPMENT

Objective -- To develop in producers an understanding of how the soybean plant grows.

Problem and Analysis -- How does the soybean plant develop?

-Stages in plant development
-Characteristics of the root
-Major nutrients required throughout the stages of growth

Content Information

I. If one is to be a successful producer of soybeans an understanding of the plant's stages of growth, and management guides at each stage, will greatly reduce problems that could develop later on in the growth period.

II. Basic stages are: germination and early growth, vegetative growth, flowering stage, pod and seed formation and maturity.

III. The root system is basically a tap root type. Contrary to former thinking the roots do develop a rather large expanding fibrous system, depending on tillage systems. Minimum tillage makes for a long shallow fibrous rooting condition. Disking or plowing will permit rooting to the depth of the chisel zone.

IV. As to nutrient needs, during early growth to about 60 days, band fertilizer treatments will get the young plant off to a good start. At later stages of growth plants will require larger amounts of nutrients. Because roots function in moist soil it is necessary to plow under adequate amounts of fertilizer to supply the nutrient needs of the plant. From 60 days to maturity (as opposed to the first 60 days) the soybean plant will use approximately four times the N, P, and K needed in earlier development. The total plant weight of nutrients will increase almost seven times in total nutrient up-take. A pH of 6.5 to 7 is optimum for soybean production.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. The parts of a soybean plant.
2. The stages of growth for a soybean plant.

3. The management practices which should be followed for optimum plant growth and production during each stage of development.
4. How legumes convert nitrogen from the air to usable forms.
5. Growth stages during which nitrogen, phosphorus and potassium are in greatest demand.

B. Things for class members to bring out:
1. Why an understanding of soybean plant development is necessary for producers.
2. Present management practices.
3. Observations of plant growth habits under varying conditions.

II. Conclusions

A. Farmers should know the ten stages of growth, what happens in each stage, and how these stages affect management decisions.

B. Watch cultivation so as not to damage fibrous roots; avoid killing the soybeans.

C. Apply about four times the fertilizer during the last half of plant growth than was given earlier; maintain optimum pH for top yields.

III. Enrichment Activities

A. Direct individuals in preparing a "GROWTH CALENDAR" to show the time of year soybean plants normally pass through each growth stage.

B. All class members need to have full understanding of the parts of the soybean plant and their functions. Have samples available and let the class work with them.

C. Use soil tests, former crop yields, etc., as aids in determining balanced applications of N, P, K and MN.

D. Use real soybean plants (including roots when possible) or charts, and have the class identify the different parts of the plant and discuss how the plant develops.

IV. Suggested Teaching Materials

A. References
1. In packet

a. How a Soybean Plant Develops, Iowa Special Report No. 53.
b. What is This Plant Called Soybean? Plant Food Review.

2. Additional reference
a. Modern Soybean Production by Scott and Aldrich, Chapter 1.

B. Audio-visuals
1. Slides. "Development of the Soybean Plant". Set of 31 slides available from: Visual Instruction Service, 121 Pearson, Iowa State University, Ames, Iowa 50010. Price: $6.35 postpaid.

Lesson 3

SELECTING QUALITY SEED

Objective -- To develop the effective ability of soybean producers to secure high quality seed.

Problem and Analysis -- What standards should our soybean seed meet?

-Recommended varieties
-Seed quality
-Testing seed
-Handling seed
-Seed characteristics

Content Information

I. Varieties differ greatly in the length of time they require to reach maturity. Time of maturity is further affected by latitude, planting date, weather and soil type. For instance, the same variety will mature earlier in a southern area than the North because the period of daylight during the summer is slightly shorter in the South. A week's difference in planting date will usually change time of maturity by only two or three days. Drought, hot or cool weather, and disease can cause soybeans to mature earlier or later than they normally do. Dark soils will usually delay maturity, while light sandy soils will hasten it. Full-season varieties generally yield more than those that mature very early. However, the variety should mature before cool weather slows growth and pod development and reduces yields. New varieties may be expected to be more resistant to disease, less susceptible to lodging and shattering, but all these desirable characteristics may not be bred into one single variety. Sometimes in order to get lodging resistance an undesirable characteristic has to be kept, such as the tendency to shatter under adverse conditions. Recommended varieties are: Early--Calland, Wayne, Clark 63; Medium--Cutler '71, Kent, SRF 450; Late--Dare, York, Hood, Lee, and where Cyst Nematode is a problem, plant Custer, Dyre or Pickett.

II. High-quality seed is just as important in making money with soybeans as it is with other crops. The most important quality factors include:

A. Varietal purity.

B. Germination and vigor.

C. Mechanical purity.

D. Weed seed.

E. Other crop seed.

F. Uniformity in size.

III. "Blend" and "brand" are words that may be new to the purchaser of soybean seed. A "blend" is a particular mixture of varieties or species. A "brand" is a registered trademark or trade name selected by a company to distinguish and identify the seed it sells.

IV. Viability is a quality factor that can be tested. The grower cannot afford to plant seed without knowing the results of a germination test. It is obvious that seed that germinates 90 per cent will establish more seedlings per pound than that germinating a mere 70 per cent. Less widely known is the fact that seedling vigor -- the ability of the young plant to grow rapidly and withstand stress -- usually is greatest in the seed with the highest level of germination.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Factors to consider in selecting varieties.
2. Recommended varieties for the community.
3. Causes of variation in maturity.
4. Differences between blends and brands.
5. Need for testing seed before planting.
6. Precautions in handling seed.

B. Things to get class members to bring out:
1. What they consider important in a variety.
2. Sources of quality seed.
3. Experiences with poor seed.
4. Experiences with new varieties.
5. Observations from those attending soybean demonstration plots.

II. Conclusions

A. Use at least two, possibly three varieties -- early, full season and cyst nematode resistant.

B. Select seed on the major quality factors.

C. Test all seed for germination. For fast results, conduct a ragdoll test at home.

D. To be safe, purchase only certified seed. If blends or brands are purchased, identify quality level first and field test in a small lot.

E. Plant seed with high germination for more viable seedlings.

III. Enrichment Activities

A. Secure seed samples and conduct germination tests; "read" tests and make recommendations.

B. Distribute a list of certified seed growers.

C. Plan and develop varietal demonstration plots.

D. Visit a certified-seed-producing farm or/and invite the owner in to discuss his program.

E. Develop a list of seed-quality factors vital to the wise purchase of seed for the community.

F. Have a member of the Kentucky Seed Improvement Association in as a speaker on association activities.

IV. Suggested Teaching Materials

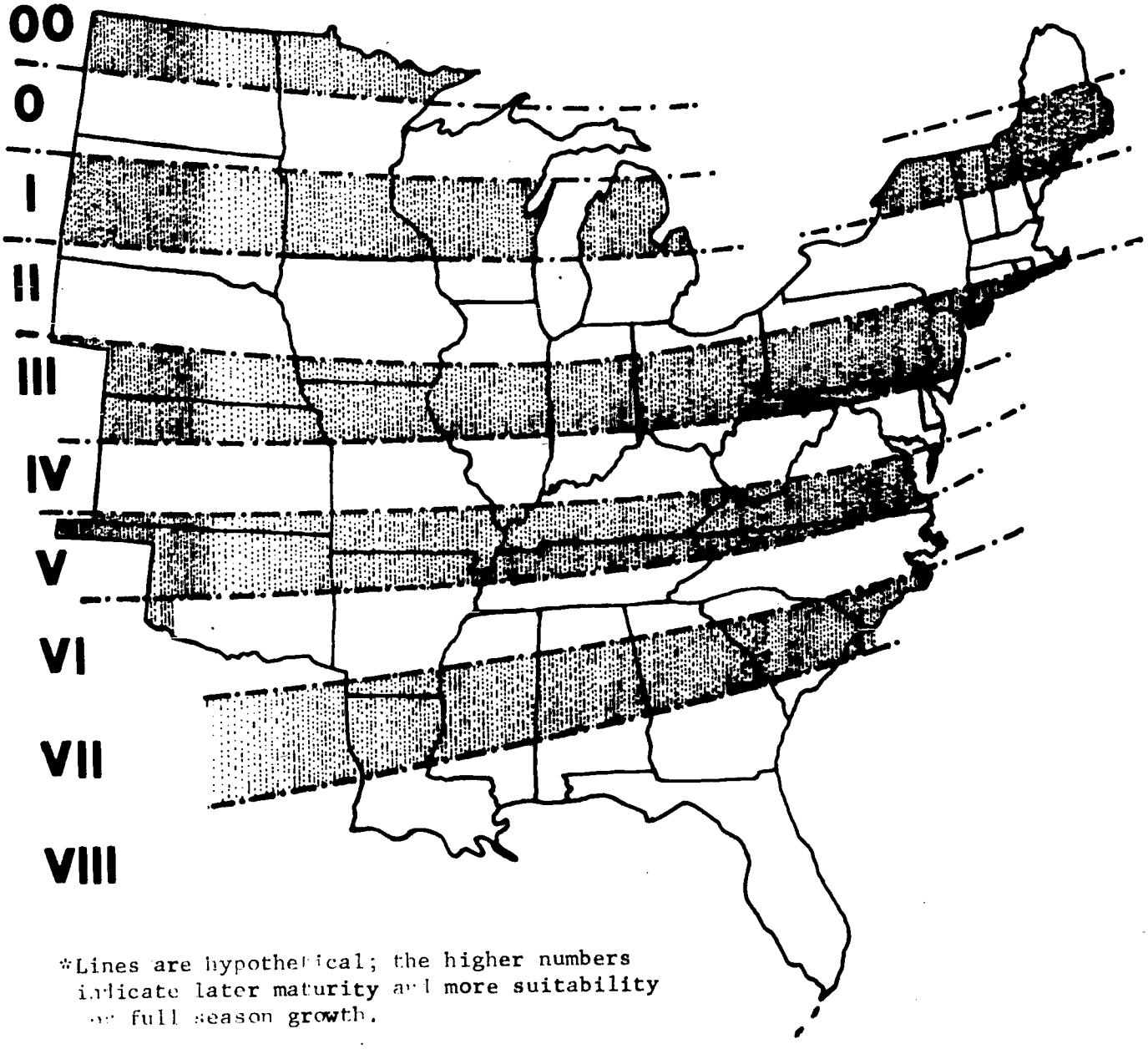
A. References

1. In packet
   a. Modern Soybean Production, Amchem Products, Inc.
   b. Soybean Farming, National Soybean Crop Improvement Council.
   c. Soybeans -- Description of Varieties, Illinois Crop Improvement Association.
   d. 1971 Performance of Commercial Soybeans in Illinois, Circular 1046.
   e. Illinois Agronomy Handbook, Illinois Circular 1049.
   f. "Hybrid Soybeans in the Future", in Agronomy Facts.
2. Additional references
   a. Kentucky Leaflet 188.
   b. Kentucky Leaflet 320.
   c. Kentucky Leaflet 17.
   d. Kentucky Leaflet 178.
   e. Kentucky Misc. 392.
   f. Kentucky PR 113.
   g. Kentucky PR 191.
   h. Modern Soybean Production by Scott and Aldrich, Chapter 2.
   i. Results of Kentucky Soybean Performance Tests, (latest edition).

j. Kentucky Certified Soybeans, Kentucky Seed Improvement Association, Inc.

B. Audio-visuals
1. Masters
-1 Maturity Classes of Soybeans (map)
-2 Soybean Variety Characteristics (chart)

MATURITY CLASSES OF SOYBEANS*



*Lines are hypothetical; the higher numbers indicate later maturity and more suitability for full season growth.

Adult 105-3-1

SOYBEAN VARIETY CHARACTERISTICS 1

VARIETY	YIELD (Bu/A)[2]						Maturity [4]	Lodging Resistance
	Henderson		Princeton		Clinton			
	3-Yr. Av. 68-71	1971	3-Yr. Av. 69-71	1971	1970	1971[3]		
WAYNE	46.6	45.0	45.5	48.4	---	---	—16	Good
CALLAND	47.9[5]	42.8	---	54.2	---	---	—14	Good
CLARK 63	43.4	39.9	45.8	49.6	37.8	22.4	—12	Good
CUTLER	49.5	44.3	49.5	54.1	40.7	24.4	— 9	Good
CUTLER 71	---	43.6	---	54.7	---	25.1	— 9	Good
KENT	48.1	47.9	49.2	52.8	39.1	27.2	0	Good
DARE	45.7	48.8	46.0	40.7	42.0	21.6	+17	Fair
YORK	53.7[5]	47.0	49.4	45.3	41.2	31.1	+18	Good
HOOD	---	---	47.0	45.3	41.9	27.4	+22	Fair

1/ All of the above varieties are susceptible to cyst nematode. If the soil is known to have cyst nematode Custer or Dyer.
2/ Based on Kentucky Soybean Performance Test—1969, 1970 and 1971, College of Agriculture, University
3/ Planted Late and Lodged Excessively.
4/ Approximate Number of Days Earier (—) or Later (+) Than Kent.
5/ Two-Year Average (1970-1971).

SOURCE: Kentucky Seed Improvement Association

SOYBEAN VARIETY CHARACTERISTICS 1/

YIELD (Bu/A)[2]						Maturity [4]	Lodging Resistance	Phytoph-thora Root Rot	Approx. Seeds/Lb.
Henderson		Princeton		Clinton					
Av. 71	1971	3-Yr. Av. 69-71	1971	1970	1971[3]				
.6	45.0	45.5	48.4	---	---	—16	Good	Sus'tble	2,700
.9[5]	42.8	---	54.2	---	---	—14	Good	Res't	2,600
.4	39.9	45.8	49.6	37.8	22.4	—12	Good	Res't	3,000
.5	44.3	49.5	54.1	40.7	24.4	— 9	Good	Sus'tble	2,600
.	43.6	---	54.7	---	25.1	— 9	Good	Res't	2,600
.1	47.9	49.2	52.8	39.1	27.2	0	Good	Sus'tble	2,600
.7	48.8	46.0	40.7	42.0	21.6	+17	Fair	Sus'tble	3,500
.7[5]	47.0	49.4	45.3	41.2	31.1	+18	Good	Med-Res't	2,600
-	---	47.0	45.3	41.9	27.4	+22	Fair	Sus'tble	3,400

varieties are susceptible to cyst nematode. If the soil is known to have cyst nematode, use a resitant variety,

ky Soybean Performance Test—1969, 1970 and 1971, College of Agriculture, University of Kentucky.
Lodged Excessively.
ber of Days Earier (—) or Later (+) Than Kent.
(1970-1971).

y Seed Improvement Association

Lesson 4

PLANNING THE FERTILIZER PROGRAM

Objective -- To develop the effective ability of farmers to plan a fertilizer program for soybeans.

Problem and Analysis -- What fertilizer program should we have for soybean production?

-Importance of soil tests
-Taking soil samples
-Major elements
-Secondary elements and micronutrients
-Timing of fertilizer application
-Analyzing plants for nutrient deficiencies

Content Information

I. The critical soil tests for most soybean growers are for pH, P and K. Soil tests have little value until they are calibrated for the grower's general soil condition. These conditions include soil texture, drainage, organic matter, previous treatments, cropping system, and fertilizer placement.

II. The trend is definitely toward broadcast application of phosphorus and potassium for all field crops, especially soybeans. Broadcasting eliminates the danger of fertilizer injury and is faster and requires less labor. It can be done in the off-season, thus interfering less with planting. Broadcasted plant nutrients cost less, due to bulk handling. Also, nutrients are more available in dry periods when fertilizer is broadcast and plowed down. In the various no-plow systems for soybeans, phosphorus and potassium are left mainly on or near the soil surface. Hence, a mulch helps to keep the surface soil moist and thus a more favorable condition for root growth and nutrient up-take.

III. A soybean crop uses up a lot of N-P-K. Each bushel of soybeans removes about 4 pounds of N, 1 pound of P, and 1½ pounds of K. This means that a 50-bushel yield will remove about 200 pounds of N, 40 pounds of P, and 70 pounds of K.

IV. Soybeans respond to P and K about as well as corn does. Response depends mainly on soil-fertility level. The higher the level, the less yield response from P and K. However, high yields can be produced only when soils are maintained at medium or high fertility. Soybeans have their own nitrogen factory in nodule bacteria. In some cases added N may give a small boost to one's crop under certain conditions such as drought, poorly-drained soils, cool weather, or poor inoculation. Most soybean fertilizers contain some N because farmers feel it helps the plant to get a jump on the weeds.

V. Soybeans are known as good "second feeders"' they scavenge for plant food remaining from previous crops. If one depends on this, be sure the fertility level is high enough so it doesn't limit the soybean yields. Most growers don't apply enough fertilizer in a rotation for soybeans. A 150-bushel corn crop and a 50-bushel soybean yield will remove about 90 pounds of P per acre -- 50 pounds in the corn and 40 pounds in the soybeans. These same crop yields will remove about 115 pounds of K per acre. In dry periods an abundant supply of P and K in the soil helps. Lime is also important in growing soybeans. In Ohio tests, liming an acid soil increased soybean yields 10 bushel per acre in a good moist year.

VI. Deficiencies of micro-nutrients are more widespread on soybeans than on most field crops. Shortages of iron, manganese, molybdenum, and zinc have been noted in several fields. Where these deficiencies are acute, the response to small corrective measures is quite striking. But more often the response, if any, is only a few bushels per acre.

VII. Tissue tests help to identify hidden hunger where a deficiency is not serious enough to cause recognizable symptoms, or to confirm a diagnosis of deficiency based on visible signs.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things for the teacher to bring out:
1. How to take soil samples, prepare them for testing, and interpret results.
2. Critical nutrients in the production of soybeans.
3. Value of secondary and micronutrients.
4. Meaning of pH; optimum range for soybeans.
5. Plant-analysis technique in determining deficiencies.

B. Things to get students to bring out:
   1. Methods and alternatives available in applying fertilizer.
   2. Responses observed after liming.
   3. Experiences with different kinds of fertilizers.
   4. Soil conditions desirable for soybeans.

II. Conclusions

A. Soil tests must be calibrated for the soil conditions present, in order to be of greatest value.

B. Soil samples must be representative of the total field.

C. Since soybeans do not respond uniformly to fertilizer (climatic sensitivity, bloom abortion) strive to maintain a balanced base exchange and sufficient P and K for plant growth.

D. The major micronutrient deficiency, Mn (manganese), can be cured by spraying Techmagnum, Sequestrene or Lanel (trade names).

E. Apply P and K in the fall and disk in.

F. Verify visible signs of deficiency by taking tissue tests.

III. Enrichment Activities

A. Demonstrate techniques of taking soil samples.

B. Have each enrollee take soil samples on his farm, send in the sample and interpret test results, plan a fertilizer program based upon the test, and calculate costs.

C. Arrange a visit to a soil-testing laboratory.

D. Secure and exhibit slides, pictures or samples of soybeans showing nutrient deficiency.

IV. Suggested Teaching Materials

A. References
   1. In packet
      a. Illinois Agronomy Handbook, Illinois Circular 1049.
      b. Modern Soybean Production, Amchem Products, Inc.
      c. Soybean Farming, National Soybean Crop Improvement Council.
      d. Agronomy Research Field Fertilizer Rate Experiments 1967-68, Illinois Pub. AG-1946.
      e. Soybean Fertility Studies, Illinois Pub. AG-1945.

f. Growing Soybeans, Illinois VAS 4033.
g. Hunger Signs in Crops, Illinois VAS 4011a.

2. Other references
   a. Controlling Soil Acidity, Ky-EC--584.
   b. Cutting Fertilizer Costs, Ky-EC--599.
   c. Nitrogen in Kentucky Soils, Ky-EC--602.
   d. Secondary and Micro-Nutrients, Ky-EC--613.
   e. Limestone and Fertilizer Requirements, Ky-EC--619.
   f. Potassium in Kentucky, Ky-EC--622.
   g. Fertilizer Facts for Kentucky, Ky-EC--624.
   h. Soil Handbook, Misc--383.
   i. Modern Soybean Production by Scott & Aldrich, Chapter 4.

B. Audio-visuals
   1. Master
      -1 Nutrient Content of a Soybean Crop

NUTRIENT CONTENT OF A SOYBEAN CROP

Parts	Lbs. Per Acre in a 50 BU/A Soybean Crop		
	N	P_2O_5	K_2O
Grain	190	45	60
Straw	60	15	40
Stubble & Roots	30	10	20
Totals	280	70	120

Lesson 5

PLANTING SOYBEANS

Objective -- To develop the effective ability of soybean producers to plant soybeans.

Problem and Analysis -- How should we plant soybeans for larger yields?

-Qualities needed in a seedbed
-Methods of seedbed preparation -- 0-Tillage, Minimum Tillage and Conventional
-When and how to plant
-Determining plant population, seeding rate and row spacing
-Determining equipment needed

Content Information

I. Management guide lines for starting the soybean crop are concerned with:

A. Good seedbed preparation

B. Row spacing

C. Seeding rates

D. Timeliness of planting

E. Depth of planting

F. Seed inoculation

G. Satisfactory weed control

II. Methods of seedbed preparation vary from fall plowing to spring disking and from minimum tillage to mulch planting. It really doesn't matter which method is used as long as it is properly done and fits into the over-all farming program. Whether one fall plows, spring plows, disks, uses minimum tillage or mulch-plants, DO A THOROUGH JOB. Poor seedbed preparation can result in less net profit in the fall.

III. The seedbed should be prepared so that the soybean seed can be planted in close contact with moist soil. Be sure the seedbed is weed-free at planting time so that the weeds will not get a "head start" on the soybeans. Land that has been in hay and pasture should usually be planted to corn rather than soybeans.

IV. "USE GOOD SEED." Soybean seed loses its vitality faster than does the seed of most other legumes. It is therefore advisable to plant seed that is not more than a year old. The seed should be free of damaged beans, plump, and well filled. A plump seed is a "full dinner pail" for the young plant. High test weight indicates high quality seed.

V. Going into the '70's, 30-inch corn row equipment is readily interchangeable with equipment needs of soybeans. And soybeans, like corn in western Kentucky, would more often respond to one or more cultivations, depending upon soil and climatic conditions.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Latest research findings relating to planting.
2. Acres required to pay for the cost of changing to narrow rows.
3. Basis and value of inoculating seed.

B. Things to get from class members:
1. Experiences with different kinds of seedbeds.
2. Tillage practices used by class members in seedbed preparation.
3. Equipment used, costs and alternate uses.

II. Conclusions

A. Your seedbed should be: fine, free of clods and firm.

B. Fit your seedbed preparation to your farm operation -- do a thorough job of the method you select.

C. Plant as early as possible; start by May 10 and finish no later than June 15.

D. Use 30 inch rows to allow interchangeability of machinery with corn.

E. The plant population should average 50,000 plants per acre (70,000 is maximum). (For further planting recommendations, see planting statisitcs master at end of lesson.)

F. Tool up to do the job; a 30 inch planter, cultivator and combine are necessary items of equipment.

G. Aim for full season use of machinery, but secure sufficient size for timeliness.

III. Enrichment Activities

A. Arrange a row-width and plant-per-acre check in class members' fields.

B. Set up a demonstration of tillage equipment.

C. Calibrate a planter on a class member's farm.

D. Demonstrate effect of depth of planting on emergence, using a flat in the classroom.

E. Visit and discuss a zero-till operation.

F. Show samples of inoculants.

IV. Suggested Teaching Materials

A. References

1. In packet.
   a. Modern Soybean Production, Amchem Products.
   b. Profitable Soybean Production, Iowa Pb., PM-441.
   c. Soybean Farming, National Soybean Crop Improvement Council.
   d. Illinois Agronomy Handbook, Illinois Circular 995.
   e. Economics of Narrow-Row Culture, Illinois paper no. 65-464, latest edition.
   f. "Status of Soybean Nodules," Plant Food Review.
   g. Growing Soybeans, Illinois VAS 4033.
   h. Inoculation of Legumes, Illinois VAS 4022.
2. Additional references
   a. Growing Soybeans, U. S. Government Printing Office, Farmers' Bulletin 2129.
   b. Growing Soybeans in Kentucky, Ky. Leaflet 17.
   c. 1970 No-Tillage Recommendations, Ky. Misc-382.
   d. No-Tillage, Soil Moisture and Temperature, Ky. PR 187.
   e. Results of Kentucky Soybean Variety Performance and Row Width, Ky. PR 113.
   f. 1970 Kentucky Soybean Performance Tests, Ky. PR 191.

g. No-Tillage Experiences in Kentucky, Paper No. 69-144.
h. Modern Soybean Production (Scott & Aldrich), Chapter 3.

B. Audio-visuals
1. Masters
-1 Planting Statistics
-2 Effect of Population and Row Spacing on Soybean Yield.

PLANTING STATISTICS

Time - When soil temperature reaches 50^{0} - 55^{0} F.

Depth - 1 - 2 inches

		Seeds/Foot*	Lbs./Acre
Rate -	40" row =	10-12	55-60
	30" row =	8-10	65-70
	20" row =	6- 8	75-80
	7" drill row =	5- 6	90-95

*(variation in seed size makes this a more accurate measure)

Soil conditions - adequate moisture
- ample oxygen in soil

EFFECT OF POPULATION AND ROW SPACING ON SOYBEAN YIELDS

Plants per Acre	Yield in Bushels per Acre from Row Spacing of:			Percentage Yield Increase Over 40-inch Rows from Row Spacing of:	
	10 in.	20 in.	40 in.	10 in.	20 in.
25,000	43 bu.	39 bu.	36 bu.	19%	7%
50,000	47	44	38	23	16
100,000*	48	40	35	35	13
200,000	37	33	36	3	-7

* - Plants $1\frac{1}{2}$ inches apart in 40-inch rows give 100,000 plants per acre.

SOURCE: Profitable Soybean Production
Iowa State University Co-Op Extension Service
Ames, Iowa

Lesson 6

CONTROLLING WEEDS IN SOYBEANS

Objective -- To develop the effective ability of farmers to control weeds in soybeans.

Problem and Analysis -- How can we control weeds in soybeans?

-Using present cultural practices
-Selecting and applying pre-emergence herbicides
-Selecting and applying post-emergence herbicides
-Selecting application techniques and application options available with different equipment and herbicides
-Calibrating herbicide applicators

Content Information

I. Basically weeds fall into two classes, grasses and broadleaf plants. Hence, know your weed problem and select herbicides to do the job.

II. Cultural practices of weed control are either mechanical or chemical measures.

A. Mechanically:
1. Disk to kill weeds and give beans a "head start".
2. Rotary hoe at stage one to kill young germinating weeds and thin the stand of soybeans.
3. (Usually a one-time cultivation -- with sweeps -- so bean roots can spread to center of the 30 inch balk in six weeks after planting.

B. Chemically:
1. Apply chemical pre-emergence and fallow pre-emerge with P and K applications. Treflan and Vernam may be used.
2. Apply post-emerge.
3. Utilize aerial application of herbicides.
4. Research is now being done on biological weed control.

III. Questions common to herbicides are:

A. Application techniques to use, granular or liquid (band or broadcast).

B. What application options to adopt, pre-plant (soil incorporated), pre-emergence, or post-emergence.

C. Is herbicide compatible with liquid fertilizers?

D. Also, questions as to:
1. Length of control.
2. Percentage of organic matter in soils.
3. Crop rotations.
4. How about crop tolerance.
5. Bi-crop clearance (corn and soybeans).

IV. When using a sprayer to apply herbicides be certain the tanks are clean and the pump and hoses are in good working order. With brass nozzle tips, the holes wear larger and the distribution pattern changes with use. Brass nozzle tips are low-cost items that can be easily replaced. Research suggests replacement after each nozzle has been used for banding 100 acres. For a four-row planter this means replacing the four tips after planting 400 acres. For best results be certain to use the tips that the manufacturer recommends to give even distribution across the band, and be sure all tips on the sprayer unit are the same size.

V. In 1971, Southern weed bandits robbed Mississippi growers of 20% of their crop of soybeans. They gave up 7.24 bushels per acre for a total loss of $30 million dollars. Tennessee was second with the weediest fields, forfeiting 17.9 per cent of its crop, while Kentucky came in third with a 16.58 per cent loss. In dollars, Tennessee growers were robbed of $18 million and Kentucky growers were robbed of 11 million dollars. It is estimated the weeds robbed all U.S. growers in 1971 of over 428 million dollars. (Losses were figured at $3.00 per bushel.)

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Results of research on herbicides.
2. Available kinds and costs of herbicides.
3. Characteristics of broadleaf weeds and grasses.
4. Application options of herbicides.
5. Precautions in using herbicides.

B. Things to get from class members:
1. Major weeds found in their soybeans.
2. Herbicides now used, their effectiveness and cost.
3. Application techniques used and available.
4. Cultural practices used to control weeds.

II. Conclusions

A. Know your weeds and apply the proper control measure in a timely manner; work seedbed well to kill all the weeds you can; follow with herbicide to control weeds after planting.

B. In selecting herbicides, follow Extension Service and manufacturers recommendations.

C. Follow manufacturers recommendations in using sprayers and granular spreaders so as to get proper application.

III. Enrichment Activities

A. Make and display lists of weeds to be controlled in the community.

B. Use representatives of chemical companies as resource persons.

C. Plan a weed-control tour to observe practices.

D. Conduct demonstration plots: types, rates, methods of application and effectiveness. Involve chemical companies and local dealers.

E. Have samples of the various chemicals available.

F. Calibrate sprayers.

G. Secure and study labels of the chemicals.

IV. Suggested Teaching Materials

A. References

1. In packet
   a. Soybean Farming, National Soybean Crop Improvement Association.
   b. Modern Soybean Production, Amchem Products, Inc.
   c. Illinois Agronomy Handbook, Illinois Circular 976.
   d. Bioassay for Herbicide Residue, Illinois Agronomy Facts W30.
   e. Recognizing and Reducing Herbicide Injury, Illinois Agronomy Facts W31.
2. Additional references
   a. Chemical Control of Weeds in Farm Crops in Kentucky, Ky. Misc. 113.
   b. Modern Soybean Production (Scott & Aldrich), Chapter 6.
   c. Herbicide Handbook, Monsanto, Volume I.

d. 1972 Sample Labels, Geigy.
e. Quick Reference for Grass and Weed Control, Dow Chemical Company.
f. The Stauffer Weeders No. 2, Stauffer Chemicals.

B. Audio-visuals
1. Masters
-1 Weed Control Manual for Soybeans
-2 A and B:Chemical Weed Control Rating Chart
-3 A to F:Herbicide Comparison Charts and Worksheets
-4 Soybean Herbicide Test for 1972
2. Slides
a. "Calibrating Field Sprayers," Illinois VAS Slidefilms, 442.
b. "A Systematic Approach to Weed Control," Illinois VAS Slidefilm, 799.
c. "Recognizing Herbicide Injury," Illinois VAS Slidefilm 798.
d. "Using Pre-Emergence Herbicides," Illinois VAS Slidefilm 797.

PAGE 30 OF THIS DOCUMENT WERE REMOVED PRIOR TO ITS BEING SUBMITTED TO THE ERIC DOCUMENT REPRODUCTION SERVICE BECAUSE THEY WOULD NOT REPRODUCE IN MICROFICHE.

weed control manual for SOYBEANS

PRODUCT	WEEDS CONTROLLED	WHEN TO APPLY
Premerge (DNBP amine)	Annual grasses and annual broad leaved weeds.	Preemergence/early postemergence; apply from cotyledon to first true leaf state to seedling weeds.
Amiben (amiben)	Most broad leaved and grassy weeds.	Preemergence at, or immediately after, planting.
Lorox (linuron)	Most annual broadleeved weeds and grasses.	Preemergence. (Direct postemergence treatment in the Mid-south).
Vernam (vernolate)	Annual grasses and broadleaved weeds. Nutsedge (nutgrass).	Preplant, incorporated; at planting, subsurface. Postemergence with soil incorporation when crop is 1-2" tall.
Randox (CDAA)	Annual grasses.	Immediately after planting or before plants emerge.
Treflan® (trifluralin)	All annual grasses; many broadleeved weeds.	Preemergence (may be applied as much as 10 weeks prior to planting). May also be applied in the fall.
Ramrod (propachlor)	Annual grasses and broadleaved weeds.	Preemergence right after planting, before plants emerge.
Planavin 75 WP; 4-WDL (nitralin)	Most small seeded annual grasses and broadleaved weeds.	Preplant and preemergence with soil incorporation within 48 hours.
Dowpon (dalapon)	Johnsongrass.	Preplant.
Tenoran® 50 WP (chloroxuron)	Annual broadleaved weeds: cocklebur, jimsonweed, pigweed, smartweed, velvetleaf.	Postemergence over the top or directed to soybeans after true leaves appear and to weeds less than 2" tall.
Butyrac 175 (2,4-DB)	Cocklebur; partial control of redroot pigweed and annual morning glory.	7-10 days prior to blooming and up to midbloom; foliage should be dark green and about knee high.
Enide 50 W (diphenamid)	Wide variety of annual grasses and broadleaved weeds.	At planting.
Lasso (CP 50144)	Annual grasses and broadleaved weeds.	Preemerge; or immediately after planting.
Dacthal W-75	Foxtail, crabgrass, Johnsongrass from seed, barnyardgrass, pigweed, and other broadleaved weeds and grasses.	Preplant incorporated; at planting (as a surface application) can be incorporated several days prior to planting.
Herbitox (naphtha)	Small seedling grasses, water grasses, perennial and annual vines.	Postemergence, between 12th and 16th day of plant growth.
Carbyne (barban)	Wild oats.	2-leaf stage of wild oats.
Glytac	Annual grasses, Johnsongrass, coffeeweed, rough pigweed; other tall-growing, broadleaved annual weeds.	When weeds are about 12" tall.
Liquid Alanap (NPA)	Certain broadleaved weeds, especially foxtail, cocklebur and velvetleaf.	Preemergence at planting time.
Granular Alanap (NPA)	Certain broadleaved weeds and grasses: cocklebur, velvetleaf and jimsonweed.	Preemergence, immediately after seeding.
Liquid Alanap Plus (NPA + CIPC)	Smartweed, ragweed, velvetleaf, cocklebur and jimsonweed.	Preemergence.
Granular Alanap Plus (NPA + CIPC)	Smartweed, ragweed, velvetleaf, cocklebur, and jimsonweed.	Preemergence.
Dyanap (NPA + DNBP)	Most annual weeds, especially foxtail, cocklebur, velvetleaf and pigweed.	From planting to just before crop emerges; as a followup after a preplant incorporated herbicide.
Diquat (diquat)	Preharvest crop and weed desiccant.	One week before harvest.
Ortho Paraquat (paraquat)	Emerged annual broadleaved weeds and grasses; topkill and suppression of perenniels.	Preplant or preemergence.

SOURCE: Soybean Digest, February 1969, p. 24.

Adult 105-1-2A

PAGE(S) 31 OF THIS DOCUMENT WERE REMOVED PRIOR TO ITS BEING SUBMITTED TO THE ERIC DOCUMENT REPRODUCTION SERVICE BECAUSE THEY WOULD NOT REPRODUCE IN MICROFICHE.

The Soybean Digest presents "Weed Control Manual for Soybeans," a table of currently available information on herbicides and weed chemicals for use with soybeans. The information was supplied by the manufacturers in answer to a questionnaire.

The Digest urges that additional detailed information on utilization of specific herbicides for individual soil, climate and crop conditions be obtained from a county agent, extension specialist, dealer or manufacturer's representative. Inclusion of the material does not constitute an endorsement of any of the products by the Soybean Digest or the American Soybean Assn.

APPLICATION RATE/ACRE	OTHER DATA
6-7½ lbs. act./2¼-3 lbs. act.	Treatment may injure soybeans if heavy rains follow application before crop emergence. Do not use if temperature is expected to exceed 85°F. Not for very light, sandy soil.
2-3 lbs./12-15 gals. water broadcast basis; ⅔-1 lb., band.	Rates are the same for all types of soil. Do not graze treated areas or feed forage to livestock.
1-5 lbs. 50W (depending on soil type) in 25-40 gals. water.	Do not plant crops other than corn or soybeans within 4 months after treatment.
2-3 lbs., depending on type of soil.	Must be incorporated. Seasonal weed control. Malformation (leaf crinkle) of the primary leaves is not an unusual temporary condition and will not affect yields. Liquid or granular; granular can be applied by air.
Liquid: overall, 5 qt.; band, 1⅓ qt. Granular: overall, 25 lbs., band, 7 lbs.	Do not use on sandy soils. Granular appears to be more effective than liquid. Liquid may be irritating to the skin. Extremely effective on high organic matter (74%) soils.
1-2 pts. per acre, broadcast basis; low rate for lighter soil, higher rate for heavy soil.	One application per season. Must be incorporated. Does not need rain or irrigation to activate it; resists leaching. Check label for geographical limitations and soil differences.
Broadcast: 6-7½ lbs. WP; band: 2-2⅓ lbs. WP; band: 7-8¾ G.	Only cleared on soybeans for seed planting purposes—not for oil. Plant seeds as uniformly deep as feasible. Do not cut immature plants for silage.
⅔-2 lbs. depending on soil type; 1-3 pts. depending on soil type.	Mixes and sprays readily when combined and agitated properly with liquid fertilizers. Effective with or without rain.
5-10 lbs.	Wait 3 days then follow by plowing or deep disking. Then wait at least 2½ weeks before planting sprayed areas.
2-3 lbs./25-40 gals. water + 5% Adjuvan T surfacant or 6 lbs./25-40 gals. water without surfacant.	Postemergence: apply to soybean plants any time after true leaves to layby, but broadleaved weeds should be 2" or less. Do not apply to soybean flowers. Do not graze treated fields with livestock nor apply within 120 days of harvest.
1 gal./100 gals. water; 10 gals. spray mixture per acre.	Do not add any wetting agents or detergents. Do not apply after midbloom. Do not apply to drought stressed soybeans.
4-6 lbs. (varying with soil) + ½ lb. of linuron or 3 lbs. of CIPC. 6-10 lbs. (varying with soil) straight.	Shallow cultivation (½-2") will not destroy effectiveness. Do not graze treated areas or feed treated forage to livestock. Do not plant treated areas to food crops other than soybeans within 6 months after treatment.
Liquid: overall, 1½-2½ qts.; Granular; overall, 15-25 pounds; proportionate amount in band.	Effective over all soil types. USDA clearance being sought.
6-12 lbs. (4½-9 lbs. act.)	Light incorporation increases effectiveness under dry conditions. Incorporation not needed immediately. Lower rates for lighter soils. One application per season.
5 gals.	Apply only once a season.
4-6 oz.	Do not spray after soybeans reach first full trifoliate leaf stage or 14 days after emergence. Minnesota and N. Dakota only. Do not graze treated area or feed treated forage to livestock.
1 qt./5 gals. diesel fuel or #2 fuel oil as spot application basal treatment on weeds only.	Do not apply in soybean fields after seed pods have formed. Spray toxic plants; use care to spray weeds only. Do not graze or feed plants from treated area to livestock.
Broadcast: 16 pts.; 12" band, 5 pts. on 40" row.	One application rate suitable for 90% of soil types; rate adjustments are recommended for remaining 10% of soils.
Broadcast: 40 lbs.; 14 lbs./14" row for band application.	
1½ gals./40 gals water.	Do not incorporate. Do not use on silt loam soils of extremely fine texture. Do not use on corn or vine crops.
Broadcast: 40 lbs.; 14 lbs./14" band on 40" row.	Do not incorporate. Do not use on silt loam soils of extremely fine texture. Do not use on corn or vine crops.
6 qts./20-30 gals. water.	Do not use on sand. Increase application rate by ½ on heavy soils.
1½-2 pts. (varying rates for ground or air spray).	Seed crop only. Do not use seed from treated plants for feed, food or oil purposes. Do not graze treated area or feed forage to livestock.
1-2 qts. (varying rates for ground and aerial application).	Will not control weeds and grasses emerging after application. Crop plants emerged at time of application may be damaged.

SOURCE: Soybean Digest, February 1961, p. 25.

Adult 105-6-63

CHEMICAL WEED CONTROL RATINGS FOR SOYBEANS

Effectiveness
0–3 none to slight
4–6 fair
7–8 good
9–10 excellent

HERBICIDES / WEEDS	Annual sedge	Barnyardgrass	Bermuda grass	Canada thistle	Carpetweed	Coffeeweed (sesbania)	Cocklebur	Crabgrass	Cupgrass	Foxtail, giant	Foxtail, yellow	Goosegrass	Jimsonweed	Johnson grass, rhizome	Johnson grass, seedling	Lambsquarter	Milkweed, climbing	Morning glory	Nutsedge, purple	Nutsedge, yellow	Pigweed	Purslane	Quackgrass	Ragweed	Smartweed	Spurge	Teaweed (spiny sida)	Wild cane	Velvetleaf	Crop tolerance G–Good F–Fair
Preplant or Pre-emergence																														
Alanap	–	6	–	0	7	–	5	6	–	6	6	6	5	1	2	6	1	4	–	1	6	7	1	7	4*	–	6	2	5	F
Alanap plus	–	6	–	0	7	–	5	6	–	6	6	7	6	0	3	6	0	4	–	1	7	7	0	7	7	–	7	2	4	F
Amiben	8*	9	0	0	9	4	4	9	10	8	9	7	4	0	5*	8	0	3	0	1	9	8	0	8	7	7	6	4	6	G
CIPC	9	6	0	0	10	0	2	7	–	6	7	6	1	0	2	5	0	2	0	0	5	3*	0	3*	8	6	3*	2	2	F
Dacthal	8	7	0	0	8	2*	2	8	8	7	7	7	2	0	4	5	0	2	0	1	6	7	0	2	5	5	3	3	2	G
Dyanap	9	8	0	–	10	6	8	8	–	7	8	7	8	0	3	8	0	8	0	0	9	9	–	–	5	9	8	–	7	F
Lasso	8	9	0	0	8	3	1	9	–	9	9	8	3	0	5*	6	1	2	3	4*	8	8	0	3*	5	7	5	2	2	G
Lorox	8*	8	0	0	9	5	5	8	8	8	8	8	5	0	3*	8	2	5	1	1	9	8	1	8	8	7	7	2	6	F
Planavin	1	8	0	0	9	1	1	9	10	9	9	9	1	0	9	6	0	4	1	1	7	7	0	2*	4	5	2	9	1	G
Preforan	–	8	–	–	8	–	6	8	–	9	9	–	–	–	–	9	7	8	–	–	9	–	–	9	9	–	–	–	5	G
Ramrod	–	8	–	0	7	–	1	9	–	9	9	8	1	0	4*	6	0	1	–	3	7	7	0	4*	3	–	7	1	2	G
Randox	–	7	–	0	5	–	1	7	–	8	8	6	1	0	3*	5	0	1	–	2	6	7	0	3	2	–	7	0	1	G
Solo	9	7	0	0	8	5	5	7	–	7	7*	7	5	0	3	6	0	5	0	1	7	8	1	6	6	7	7	1	5	F
Treflan	1	9	0	0	9	1	1	9	10	9	9	9	1	0	9	6	0	4	1	1	8	7	0	1	4	5	2	9	1	G
Vernam	8*	9	0	0	9	3*	3	9	8	8	8	8	2	1	8*	5	1	5	7	6	7	7	1	2	3*	5	4	8	4	F
Post-emergence																														
Dinitro	7	6	0	3	8	7	8	7	3*	4*	5*	4	7	1	4*	8	1	8	2*	3	8	9	1	8	8	9	8	0	8	F
Herbicidal oil	8	8	0	–	8	7	5	8	8	7	8	8	5	2	8	10	0	7	2*	2*	9	9	–	8	7	9	6	–	6	G
Lorox + surfactant	7*	8	0	–	9	9	8	9	8	6	7	7	7	0	7	10	0	8	2*	2	8	9	–	7	7	8	9	–	10	G
Tenoran + surfactant	2	2	0	1	8	7	7	2	2	2	3	4	7	0	2	7	3	7	1	1	8	8	0	6	6	7	6	1	3	F
2,4-DB (early)	0	0	0	1	8*	3*	9	0	0	0	0	0	8*	0	0	3	2	8	0	0	5*	4*	0	4*	3*	6	5*	0	2	F
2,4-DB (late)	0	0	0	1	6*	2*	7	0	0	0	0	0	3	0	0	2	0	5	0	1	3	4	0	3	3	6	3	1	2	F

Product	Crop	Barnyard Grass	Button Weed	Carpet Weed	Cocklebur	Giant Foxtail	Green Foxtail	Yellow Foxtail	Goosegrass	Horseweed	Jimsonweed	Johnson Grass (Seedlings)	Lambsquarter	Annual Morning Glory	Nutgrass (Yellow Nutsedge)	Fall Panicum	Pigweed	Ragweed	Shattercane	Smart Weed	Velvet Leaf	Crabgrass	Incorporation	
Amiben	Soybeans	G	G	F	F	G	G	G	G	P	F	G	G	F	G	G	G	G	P	G	G	G	No	
Amiben 10 G	Soybeans	G	G	F	F	G	G	G	G	P	F	G	G	F	G	G	G	G	P	G	G	G	No	
Amilon WP	Soybeans	G	G	G	G	G	G	G	G	F	G	G	G	F	G	G	G	G	P	G	G	G	No	
C.I.P.C.	Soybeans	G	P	G	P	G	G	G	P	P	P	P	P	P	P	P	P	P	P	G	P	P	No	
C.I.P.C. 10 G	Soybeans	G	P	G	P	G	G	G	P	P	P	P	P	P	P	P	P	P	P	G	P	P	No	
Cyanap	Soybeans	F	G	G	G	F	F	F	F	G	G	F	G	G	P	P	G	G	P	F	G	F	No	
Lasso E.C.	Soybeans & Corn	G	P	G	P	G	G	G	G	P	P	G	G	P	G	G	G	G	G	P	P	G	Both	
Lasso 10 G	Soybeans & Corn	G	P	G	P	G	G	G	G	P	P	G	G	P	G	G	G	G	G	P	P	G	Both	
Lasso Lorox	Soybeans	G	G	G	G	G	G	G	G	F	F	G	G	P	G	G	G	G	G	G	G	G	No	
Lorox 50 WP	Soybeans	G	G	G	F	G	G	G	G	F	F	P	G	P	P	G	G	G	P	G	G	G	No	
Lorox G	Soybeans	G	G	G	F	G	G	G	G	F	F	P	G	P	P	G	G	G	P	G	G	G	No	
Maloran	Soybeans	G	G	G	G	G	G	G	F	P	G	P	G	G	P	P	G	G	P	G	G	G	No	
Planavin 75 W	Soybeans	G	P	P	P	G	G	G	G	F	P	G	G	P	P	P	G	G	P	G	P	P	G	Yes
Preforan E.C.	Soybeans	G	P	G	F	G	G	G	G	P	G	P	G	G	P	G	G	G	P	G	P	F	No	
Preforan G	Soybeans	G	P	G	F	G	G	G	G	P	G	P	G	G	P	G	G	G	P	G	P	F	No	
Solo	Soybeans	G	G	F	G	G	G	G	G	G	G	G	F	G	G	P	F	G	G	P	G	G	F	No
Solo G	Soybeans	G	G	F	G	G	G	G	G	G	G	G	F	G	G	P	F	G	G	P	G	G	F	No
Tenoran	Soybeans	G	G	G	G	P	P	P	F	P	G	P	P	G	P	P	G	G	P	G	G	P	No	
Treflan E.C.	Soybeans	G	P	G	P	G	G	G	G	P	P	G	G	P	P	G	G	P	G	P	P	G	Yes	
Treflan G	Soybeans	G	P	G	P	G	G	G	G	P	P	G	G	P	P	G	G	P	G	P	P	G	Yes	
Vernam 6 E	Soybeans	G	G	G	P	G	G	G	G	P	G	G	G	G	G	P	G	P	G	P	G	G	Yes	
Vernam 10 G	Soybeans	G	G	G	P	G	G	G	G	P	G	G	G	G	G	P	G	P	G	P	G	G	Both	

SOYBEANS---1

HERBICIDE COMPARISON CHARTS - TEACHERS KEY

WEED PROBLEM

WEED CONTROL RATINGS BY HERBICIDES

GRASSES	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX	
FOXTAIL	G	G	G-	G	G-	
BARNYARD GRASS	G	G	G-	G	G-	
CRABGRASS	G	G	G-	G	G-	
FALL PANICUM	G	G	F	G	G-	
NUTSEDGE	G	P	P	F	P	
SEEDLING JOHNSON GRASS	G	G	F	G	P	
QUACKGRASS	P	P	P	P	P	
WILD CANE	P	G	F	F	F	

BROADLEAVES:

COCKLEBUR	P	P	F-	G-	F	
JIMSONWEED	P	P	F-	G-	F	
LAMBSQUARTER	G-	P	G	G	G	
MORNING GLORY	P	P	P	P	P	
PIGWEED	G-	G-	G	G	E	
RAGWEED	G-	P	G-	G	G	
SMARTWEED	F	P	G-	G	G	
VELVETLEAF	P	P	F-	G	F	

G = Good
F = Fair
P - Poor

Adult 105-6-3A

SOYBEANS---1

HERBICIDE COMPARISON CHARTS - WORKSHEET

WEED PROBLEM

WEED CONTROL RATINGS BY HERBICIDES

GRASSES	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX	
FOXTAIL						
BARNYARD GRASS						
CRABGRASS						
FALL PANICUM						
NUTSEDGE						
SEEDLING JOHNSON GRASS						
QUACKGRASS						
WILD CANE						

BROADLEAVES:

COCKLEBUR						
JIMSONWEED						
LAMBSQUARTER						
MORNING GLORY						
PIGWEED						
RAGWEED						
SMARTWEED						
VELVETLEAF						

Adult 105-6-3B

SOYBEANS---2

HERBICIDE APPLICATION TO SOYBEANS - TEACHERS KEY

APPLICATION TECHNIQUE	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX
GRANULAR	Yes	No	Yes	No	Yes
BAND	Yes	-	Yes	-	Yes
BROADCAST	Yes	-	? Yes	-	Yes
LIQUID	Yes	Yes	Yes	Yes	Yes
BANK	Yes	?	Yes	Yes	Yes
BROADCAST	Yes	Yes	Yes	Yes	Yes
APPLICATION OPTIONS:					
PREPLANT SOIL INCORPORATED	Yes	Yes	No	No	No
PRE-EMERGENCE	Yes	No	Yes	Yes	Yes
POST-EMERGENCE	?	No	No	No	No
LIQUID FERTILIZER	Yes	Yes	No	Yes	Yes

SOYBEANS---2

HERBICIDE APPLICATION TO SOYBEANS - WORKSHEET

APPLICATION TECHNIQUE	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX
GRANULAR					
BAND					
BROADCAST					
LIQUID					
BANK					
BROADCAST					
APPLICATION OPTIONS:					
PREPLANT SOIL INCORPORATED					
PRE-EMERGENCE					
POST-EMERGENCE					
LIQUID FERTILIZER					

SOYBEANS---3

OTHER CHARACTERISTICS OF HERBICIDES - TEACHERS KEY

	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX
LENGTH OF CONTROL	Medium	Medium	Short	Medium	Medium
O.M. %	All	Lt. Soils	Heavy	All	All
CROP ROTATION	Yes	Yes	Yes	Yes	Caution
CROP TOLERANCE:	Fair	Good	Good	Fair	Fair
BI-CROP CLEARANCES (CORN & BEANS)	Yes	No	No	?	Yes

SOYBEANS---3

OTHER CHARACTERISTICS OF HERBICIDES - WORKSHEET

	LASSO	TREFLAN	AMIBEN	LASSO/ LOROX	LOROX
LENGTH OF CONTROL					
O.M. %					
CROP ROTATION					
CROP TOLERANCE					
BI-CROP CLEARANCES (CORN & BEANS)					

SOYBEAN HERBICIDE TEST FOR 1972

MILES FARMS, RT. 3, OWENSBORO, KY.

(PLANTED 4 MAY IN 30" ROWS, CALLAND VARIETY, HARVESTED 3 OCTOBER.)

HERBICIDE RATE AND PLACEMENT		AC/HARVESTED	YIELD/AC.
SOLO (4 qt.),TREFLAN (1 qt.)	In Crop	.846	56.73
EL 119 (1½#), AMIBEN (½ gal.)	In Crop	.846	53.78
PREFORAN (5 qt.), NO MOLY	In Crop	.635	61.66
PREFORAN (5 qt.), WITH MOLY	In Crop	.635	60.88
LASSO (2 qt.), LOROX (1#)	In Crop	.635	56.42
SOLO (4 qt.)	In Crop	.635	56.15
EL-199 (3#)	In Crop	.846	53.78
TREFLAN (1 qt.), DYNAP (5 qt.)	Cracking	.635	58.78
LASSO (1½ qt.), WITH MOLY	In Crop	.635	58.78
LASSO (1½ qt.), MALORAN (2#)	In Crop	.635	61.41
MALORAN (4#)	In Crop	.635	52.48
CHECK PLOT -- NO HERBICIDE		.635	45.92
SOLO (5 qt.)	In Crop	.635	56.42
SOLO (4 qt.), LASSO (1½ qt.)	In Crop	.635	57.48
DYNAP (5 qt.)	Cracking	.635	52.48
LASSO (1½ qt.)	In Crop	.635	57.21
DYNAP (6 qt.), PRE-EMERGENCE	In Crop	.635	59.57
DYNAP (5 qt.), LASSO (1½ qt.),	Cracking In Crop	.635	58.26
AMOLON-(1½ qt.) LOROX, (½ gal.) AMIBEN	In Crop	.390	56.61
SOLO (5 qt.), TREFLAN (1 qt.)	In Crop	.846	57.60

Plot Average 56.91
Less Check 45.92
10.99 Bu. extra, on the average, for using herbicide in 1972 cost-wise, better than a 3-to-1 ratio!

Properly managed, one or a combination of these herbicides will lick your weed problem.

Source: Report of 1972 Variety Test Plots, Daviess County, Ky.

Lesson 7

CONTROLLING SOYBEAN DISEASES

Objective -- To develop the effective ability of producers to control diseases of soybeans.

Problem and Analysis -- How can we recognize and control diseases in soybeans?

-Common disease problems
-Means of identification
-Preventive measures
-Control meansures

Content Information

I. Approximately 50 diseases attack soybeans in the United States, but all diseases do not occur every year in a locality. A given disease may be quite destructive one year and absent the next. U.S. loss to disease in soybeans is estimated at 10 per cent annually. (A rather conservative estimate.)

II. All soybean diseases reduce yields. Even in fields that appear reasonably free of diseases, losses may be considerable because of unnoticed damage by a succession of parasites throughout the growing season. In most cases, yield reduction is not severe enough to be observed by the producer.

III. Weeds are hosts for many diseases, such as brown stem rot, although we know this disease is soil borne. As several kinds of weeds are symptom-type hosts for diseases, it is generally considered that the insect survives on one of these hosts and transmits the disease to the soybean plant.

IV. A number of soybean diseases are not effectively controlled by use of resistant varieties. Other diseases warrant control, but cannot now be controlled easily and effectively. Until resistant varieties become available, we must depend upon other methods of control, such as crop rotation and use of clean, sound seed of adapted varieties.

V. Soybean diseases are caused by bacteria, fungi, viruses and nematodes that are parasitic on the soybean plant. In order to reduce losses, a grower needs to be able to identify the disease and apply the most effective control measures.

VI. Some of the more common and widespread diseases of soybeans in the west Kentucky area are: Bacterial Blight, Bacterial Wilt, Downy Mildew, Brown Stem Rot, Phytophthora Root Rot, Pod and Stem Blight, Purple Seed Stain, Soybean Mosaic, and especially Soybean Cyst Nematode.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. There are about 50 soybean diseases in the United States; some of these are of major economic importance in this community. (List.)
2. Causes of soybean disease.
3. Means of transmittal.
4. Importance of fertilizing to prevent nutritional disease.
5. Importance of crop rotation.

B. Things to get from the students:
1. Soybean diseases experienced by growers locally.
2. Measures used to control disease; effectiveness of these measures.
3. General preventive practices.

II. Conclusions

A. Know the diseases and crop tolerances; adjust the cropping system if a syndrome of infection is being built up.

B. Farmers in areas of Kentucky bordering the Ohio River and those in the Purchase area need to be watchful for cyst nematode attacks.

C. Plant a crop of corn after two to three years of soybeans to break the disease cycle. (This is especially good for cyst nematode control.)

D. Plant resistent varieties to prevent infections, but expect lower yields.

E. Use clean, sound seed of adapted varieties.

III. Enrichment Activities

A. List and identify the more important soybean diseases of the community. (Identify whether leaf, stem, or root disease.)

B. By use of slides, charts, or opaque projector, show and discuss samples of diseased or infected soybean plants.

C. Make a list of successful cultural practices used in controlling soybean diseases. (Rotation, resistant varieties, control of weeds, deep plowing to cover organic matter, balanced fertilizer program, etc.)

IV. Suggested Teaching Materials

A. References

1. In packet
   a. Soybean Farming, National Soybean Crop Improvement Council.
   b. Modern Soybean Production, Amchem Products, Inc.
   c. Soybean Diseases, Iowa Pamphlet 528.

2. Additional references
   a. Soybean Diseases, U.S.D.A. Agricultural Handbook, No. 302.
   b. Soybean Diseases in Illinois, Illinois Circular 676.
   c. Modern Soybean Production, by Scott & Aldrich, Chapter 7.

B. Audio-visuals

1. Slides -- "Soybean Diseases in Illinois," VAS 747.

Lesson 8

CONTROLLING INSECTS IN SOYBEANS

Objective -- To develop the effective ability of producers to control insects in soybeans.

Problem and Analysis -- How can we recognize and control insects in soybeans?

-Major insect pests
-Means of identification
-Recognition of insect damage
-Control measures
-Use of chemicals

Content Information

I. Insects can easily cost the producer $15 per acre. The severity of damage by insects varies with their abundance and development of plant at time of attack; 50 per cent defoliation of early maturing beans in late July may be serious, while 100 per cent defoliation a month later may be of no consequence; but if a field is late maturing, 50 per cent defoliation in mid-August may be serious.

II. Most soybean insect problems are emergencies, although some can be prevented by not planting too early. This avoids some of the damage done by seed-corn beetles, maggots, and grape colaspis. However, early planted beans may be sufficiently mature by mid to late summer that leaf-feeding insects do not damage them. Here we have a conflict of control practices. Such practices do not always produce maximum yields of soybeans in absence of insect pests, and the average farmer must shoot for maximum yields.

III. Early Insect Problems: Seed-corn maggots, seed-corn beetles, wireworms and black cut worms.
Mid-Season Insect Problems: Japanese beetles, July grasshoppers, Two-spotted mites and three-cornered alfalfa hoppers.
Late Season Insect Problems: Green or brown stinkbugs, striped blister beetle, alfalfa webworm, green clover-worm, bean leaf beetles, Mexican bean beetles and corn ear-worm moth.

IV. Insects are supported by and increase their numbers upon weeds and volunteer plants growing earlier in the spring and later in the fall than the planted crop. Eliminating weeds from the field and field margins will be a big aid in overall insect control. It is important to kill both broadleaf weeds and grasses.

V. Too heavy reliance on the use of insecticides can lead to still another problem -- many insecticides do not have label approval for use on soybeans.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. More than 20 insects attack soybeans; those which are prevalent in this area are: (List.)
2. Categories of insects affecting soybeans and type of damage they do.
3. General practices to prevent insect damage.
4. Recommended insecticides (forms, rates, timing, cost, method of application).
5. Precautions in using insecticides.

B. Things to get from class members:
1. Experiences of class members in controlling insects.
2. How to adjust and calibrate sprayers.
3. Precautions followed in using insecticides.

II. Conclusions

A. Know the insects, the stages of growth when damage occurs, and methods of control.

B. Walk out into the fields to identify crop damage.

C. Act promptly when damage is recognized.

D. Eliminate weeds which harbor insect pests.

E. Be sure of label clearance on insecticides, check with your dealer for latest clearances.

F. Follow manufacturer's recommendation in using insecticides.

III. Enrichment Activities

A. Calendarize the insect problem (early, mid-season and late).

B. Have class members select alternative control measures. (List time, insecticide, methods -- airplane, etc.)

C. Use slides, charts, or opaque projector to show and discuss specimens of soybean insects causing damage in the community.

D. Review soybean growth stages and pin-point growth stages when insects would do the most damage to the soybean plant in seed development.

E. Secure and study insecticide labels.

IV. Suggested Teaching Materials

A. References

1. In packet
   a. Common Soybean Insects, Illinois Picture Sheet No. 6.
   b. Insect Control for Field Crops, Illinois Circular 899.
   c. Soybean Farming, National Soybean Crop Improvement Council.
   d. Modern Soybean Production, Amchem Products, Inc.
   e. Soybean Cyst Nematode, U.S.D.A.
2. Additional references
   a. Occasional Insect Newsletter, Extension Service, University of Kentucky.
   b. Insecticide Recommendations for Alfalfa, Clover & Soybeans, Ky. Misc., 279.
   c. Put a Stop to Insects in Storage Bins, Ky. Misc 387.
   d. Modern Soybean Production by Scott & Aldrich, Chapter 7.
   e. 1972 Sample Labels, Geigy Agricultural Chemicals (Dealer's reference guide).

B. Audio-visuals

1. Masters
   -1 Insecticide Recommendations for Soybeans
   -2 Chemical Recommendations for Soybean Insects
   -3 Rules for Use of Insecticides

INSECTICIDE RECOMMENDATIONS FOR SOYBEANS

Insect	Time of Attack	Insecticide[1]	Lb. Active Ingredient Per Acre	Placement	Timing
Bean leaf beatle	May-June, August	Carbaryl[2] Toxaphene[3]	1 1 1/2	On foliage	When leaf f before plan
Clover root curculio adult	May-June	Carbaryl[2] Toxaphene[3]	1 1 1/2	On marginal rows	When clover to adjacent
Grasshopper	June-September	Carbaryl[2] Toxaphene[3]	3/4 1 1/2	On foliage	When migrat begins.
Flea beetle	May-June	Carbaryl[2] Toxaphene[3]	1 1 1/2	On foliage	Seedling us when needed
Green clover worm (NHE-75) and webworm	August	Carbaryl[2] Malathion	1 1	On foliage	When damage are numerou fill.
Mites	June-August	Carbophenothion[4] Azinphosmethyl[4]	3/4 1/2	On foliage	As needed o field
Stinkbug	July and August	Carbaryl[2] Malathion	1 1	To foliage	As needed b numerous.
Thrips Leafhoppers	June-Aug.	Malathion	1	To foliage	As needed.

[1]Secure detailed instructions for insecticide restrictions on soybeans.

[2]Carbaryl should not be used at more than 1 lb. per acre. Higher rates may damage pla

[3]For use on dairy farms only when alternate material is not available and when insect
apply as foliage sprays or dusts to or adjacent to dairy pasture, hay, or forage crop

[4]To be applied only by experienced operators or those wearing protective clothing.

Source: Illinois Circular 899, Insect Control for Field Crops.

INSECTICIDE RECOMMENDATIONS FOR SOYBEANS

ime of ttack	Insecticide[1]	Lb. Active Ingredient Per Acre	Placement	Timing of Application
y-June, gust	Carbaryl[2] Toxaphene[3]	1 1 1/2	On foliage	When leaf feeding becomes severe, but before plants killed or pods eaten.
y-June	Carbaryl[2] Toxaphene[3]	1 1 1/2	On marginal rows	When clover is plowed, beetles migrate to adjacent beans.
ne-ptember	Carbaryl[2] Toxaphene[3]	3/4 1 1/2	On foliage	When migration from adjacent crops begins.
y-June	Carbaryl[2] Toxaphene[3]	1 1 1/2	On foliage	Seedling usually attacked. Treat when needed.
gust	Carbaryl[2] Malathion	1 1	On foliage	When damage appears and small worms are numerous between blossom and pod fill.
ne-August	Carbophenothion[4] Azinphosmethyl[4]	3/4 1/2	On foliage	As needed on field margins and entire field
ly and gust	Carbaryl[2] Malathion	1 1	To foliage	As needed but when stinkbug are numerous.
ne-Aug.	Malathion	1	To foliage	As needed.

ructions for insecticide restrictions on soybeans.
be used at more than 1 lb. per acre. Higher rates may damage plants.
ns only when alternate material is not available and when insect emergency exists. Do not
ays or dusts to or adjacent to dairy pasture, hay, or forage crops.
y experienced operators or those wearing protective clothing.

cular 899, Insect Control for Field Crops.

CHEMICAL RECOMMENDATIONS FOR SOYBEAN INSECTS

	INSECT PEST	DAMAGE IS DONE	HOW TO CONTROL	AMOUNT TO APPLY	TIPS ON USING
FEED ON PLANT BELOW GROUND	Seed-corn maggot	During germination	Aldrin Dieldrin Heptachlor Lindane	2 oz./bu. seed same same same	Protects only seed at planting time. Apply to seed just prior to planting. Soil applications as for wireworm can be used in place of seed treatment.
	Seed-corn beetle	During germination	Aldrin Dieldrin Heptachlor Lindane	2 oz./bu. seed same same same	Same as above.
	Wireworm	During germination & early seedling stage	Diazinon	2-4 lbs./acre	Prior to planting and disk in. Also may use seed treatment as for maggots and seed beetles.
	Grape colaspis larva	June	Diazinon	2-4 lbs./acre	As for wireworm. Cultural control best.
	White grub	May-Sept.	Diazinon	2-4 lbs./acre	As for wireworm. Control moderate. Use rotation including small grain and legume.
FEED ON SEEDLINGS, FOLIAGE IN FIRST HALF OF SEASON	Bean leaf beetle	May-June	Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1½ lbs./acre	When leaf feeding is so severe that defoliation and plant death is imminent or stand seriously affected.
	Clover root curculio	May-June	Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1½ lbs./acre	Only when damage is apparent and curculios are abundant. Spot treatment is usually all that is necessary.
	Flea beetle	May-June	Sevin Toxaphene	1 lb./acre 1 lb./acre	Rotary hoeing progressively across field may drive them into waste areas. Otherwise apply insecticide when damage appears and infestation is severe.
	Mites	June- Aug.	*Parathion *Trithion	¼-½ lb./acre ¼ lb. /acre	When damage first appears. Early control before webbing starts is best.
	Thrips	June-July	Dibrom Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1 lb./acre 1½ lbs./acre	Rarely needed and then only when leaf damage is almost complete.
	Southern corn rootworm adult	June-July	Sevin Toxaphene	1 lb./acre 1 lb./acre	Rarely necessary. Use insecticides only if defoliation is severe.
FEED ON LEAVES, BLOSSOMS, PODS LAST HALF OF SEASON	Japanese beetle	June-Aug.	Malathion Sevin	1 lb./acre 1 lb./acre	When damage becomes noticeable. Usually early July.
	Mexican bean beetle larva	Aug.-Sept.	Malathion Sevin	1 lb./acre 1 lb./acre	When damage begins to appear and larvae are still small. Apply so undersides of leaves are treated.
	Bean leaf beetle adult	August	Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1½ lbs./acre	Apply if blossoms and pods are being attacked or if defoliation is severe and pods are just forming.
	Green clover worm	July-Sept.	Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1½ lbs./acre	When damage appears and small worms are numerous.
	Alfalfa & garden webworm	July-Aug.	Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1½ lbs./acre	When damage first appears and before webbing is heavy.
	Grasshopper	July-Sept.	Dibrom Malathion Sevin Toxaphene	1 lb./acre 1 lb./acre 1 lb./acre 1½ lbs./acre	When defoliation begins and as hoppers are migrating into field. Treat adjacent infested areas first.
	Corn earworm	Aug.-Sept.	Sevin Toxaphene	1 lb./acre 1 lb./acre	When damage first noticed and worms are small and numerous.
	Stink bugs	July-Sept.	Malathion Sevin Toxaphene	1 lb./acre 1½ lbs./acre 1½ lbs./acre	When green or brown stink bugs become apparent—usually about ½ to 1 per plant.

RULES FOR USE OF INSECTICIDES

FOR YOUR PROTECTION: Always handle insecticides with respect

Wear rubber gloves

Do not smoke

Keep your face turned to one side when opening, pouring, or emptying containers

Leave unused insecticides in original containers (labels)

Store out of reach of children; buy no more pesticide than needed

Wash out and bury, burn, or haul to dump all empty containers

Do not put water hose into spray tank

Do not blow out clogged nozzles or lines with your mouth

Wash with soap and water exposed parts of body and clothes contaminated with insecticides

Do not leave puddles of spray

Do not apply to water supplies

Do not apply to areas with abundant wildlife

Do not apply near dug wells or cisterns

Do not spray or dust when conditions favor drift

Observe all precautions listed on the label

To avoid bee kill, apply insecticides after bee activity has been completed for the day; use the least toxic materials. Warn beekeepers

Source: Illinois Circular 899

Lesson 9

HARVESTING AND STORING SOYBEANS

Objective -- To develop the effective ability of producers to efficiently harvest and store soybeans.

Problem and Analysis -- How should we harvest and store soybeans?

-Harvesting techniques
-Preventing harvest losses
-Conditions for drying
-Situations for storing soybeans

Content Information

I. Harvesting.

A. No farmer would willingly dump three bushels of beans on the ground from his combine after harvesting each acre, (this is equal to a 16 per cent crop loss under average harvest conditions) yet losses of this kind continue to occur. On the average, four beans on each square foot of ground represent one bushel per acre that has been lost!

B. Most soybeans that are lost never get into the combine. Shattering, dropped stalks, and pods left on the stalk below the cutter bar account for most of the loss. Iowa tests show that cutter-bar losses increase at the rate of 1.4 bushels for each inch above ground the plants are cut. Some beans remain unthreshed in the pods as they pass through the cylinder and even some threshed beans are carried out with the straw. Combining should be started when the moisture content is below 15 per cent. Losses caused by shattering, cutter-bar action, threshing, separating, and cleaning can be minimized. The operator should check reel speed and height, ground travel speed, cutter-bar height and sharpness, pick-up action of lodged plants by guards or special attachments, cylinder speed and clearance, and flow of material over the rack and shoe. Also variance of moisture content during the day necessitates combine adjustments. The combine has been designed primarily for crops other than soybeans. A new concept in conveying beans from the field into the threshing compartment of the combine could save farmers millions of dollars.

II. Storage.

A. Soybeans should be stored in clean, dry bins at a moisture content not exceeding 13 per cent. Successful storage is dependent upon control of the temperature and moisture content. If the beans have more than 13 per cent moisture, drying with heated air can eliminate this storage risk. A tight bin is necessary to prevent the entrance of rain or show. Even in dry bins, the beans should be checked periodically for signs of heating, molding and spoilage. During cold weather, moisture tends to accumulate in the surface layer of the beans near the center of the bin. Stirring the surface at the beginning and end of the winter season will minimize any loss from this cause.

B. The soybean can be stored more than one year without an appreciable loss in quality; however, germination of seed may be reduced markedly after one year in storage. Germination should be checked in beans used for seed.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Major sources of soybean harvesting loss, percentage lost, and means to minimize.
2. How to estimate field loss.
3. Optimum percentage of moisture for harvesting and storage.
4. Economies of owning vs. hiring a combine.
5. Allowable length of storage with no quality loss to seed.
6. Procedures in making moisture tests.

B. Things to get from class members:
1. Experiences and observations of successful farmers at harvest time concerning harvesting practices followed for maximum yields.
2. Use of custom harvesting in the locality.
3. Precautions to take in harvesting to reduce loss.
4. Means used to determine moisture content.
5. Experiences with storage; systems, costs, advantages, spoilage prevention, etc.

II. Conclusions

A. Provide a clean field (free of weeds) to reduce harvesting loss.

B. Harvest on time -- when beans are ready. (Paraquat can be used to dry out delinquent beans.) Be sure the combine is set properly for field conditions.

C. Handle beans as few times as possible to reduce damage loss.

D. Screen out weed seeds before storing.

E. Reduce to 13 per cent moisture unless you are willing to lose five cents per point over 13 (penalty).

F. Store in a clean, dry bin which has been fumigated.

III. Enrichment Activities

A. Check after combining and compute loss.

B. Have each individual secure an "Operator's Manual" for the combine he operates to determine the recommended adjustments for a good job of soybean harvesting.

C. Plan a trip to observe different storage facilities for soybeans.

D. Have individuals estimate the expected yield of their soybean crop and determine if storage facilities are adequate. (Measure storage bins and find capacity.)

E. Have a representative of a local elevator discuss procedures for taking samples, making moisture tests, and determining weight-per-bushel (i.e., quality beans delivered for sale).

IV. Suggested Teaching Materials

A. References

1. In packet
   a. Modern Soybean Production, Amchem Products, Inc.
   b. Soybean Roadblocks, National Soybean Crop Improvement Council, January, 1968.
   c. Soybean Farming, National Soybean Crop Improvement Council.
   d. Custom Rates and Machinery Rental Rates, Illinois FM 8B.

2. Additional references
   a. Aeration of Stored Grain, Iowa Pub. PM 407.
   b. Aeration for Safe Grain Storage, Purdue Pamphlet AE 71.
   c. Put a Stop to Insects in Stored Grain, Ky. Misc 387.
   d. Grain Facility Needs in the Pennyroyal Area of Kentucky, Ky. Service Report, 90.
   e. Need for Additional Grain Facilities in the Lower Green River Area of Kentucky, Ky. Service Report, 94.
   f. Modern Soybean Production by Scott & Aldrich, Chapter 8.

B. Audio-visuals
   1. Masters
      -1 Cost and Return Sheet
      -2 Sources of Harvesting Losses
      -3 Loss Data Table
      -4 Method for Calculating Loss
      -5 Tips for Keeping Combine Losses Low

COSTS AND RETURNS PER ACRE FOR SOYBEANS

Yield Per Acre in Bushels

Price Per Bushel	24	26	28	30	32	34	36	38	40	42
2.00	-18	-14	-10	-6	-2	2	6	10	14	18
2.05	-17	-13	-9	-4	0	4	8	12	16	20
2.10	-16	-11	-7	-3	1	5	10	14	18	22
2.15	-14	-10	-6	-2	3	7	11	16	20	24
2.20	-13	-9	-4	0	4	9	13	18	22	26
2.25	-12	-8	-3	2	6	10	15	20	24	28
2.30	-11	-6	-2	3	8	12	17	21	26	31
2.35	-10	-5	0	4	9	14	19	23	28	33
2.40	-8	-4	1	6	11	16	20	25	30	35
2.45	-7	-2	3	8	12	17	22	27	32	37
2.50	-6	-1	4	9	14	19	24	29	34	39
2.55	-5	0	5	10	16	21	26	31	36	41
2.60	-4	2	7	12	17	22	28	33	38	43
2.65	-2	3	8	14	19	24	29	35	40	45

Growing Costs	$ 58.75	
Harvesting Costs	7.25	
	66.00	
Storage Costs	7.15	
All Costs		$73.15

Management returns per acre above growing and harvesting costs ($66.00) from different price per bushel at harvest and yield per acre combinations.

Ky/Ohio Valley Group (Irish) Adult 105-9-1

SOURCES OF SOYBEAN HARVESTING LOSSES

Type Loss	Possible Causes	Corrective measu
Preharvest	Delayed harvest, lodging and shattering	Harvest as soon reached. Plant resistant variet
Harvest losses:		
Shatter	High groundspeed; low reel speed; over-dry beans; reel too high	Maintain 2.5 to reel 15 to 20 in 25 to 50% faster reel axle 6 to 1 make sure reel d
Loose stalks	Reel too slow; groundspeed too slow; reel too high; reel axle behind cutter bar	Determine and ma reset reel to fi
Lodged stalks	Delayed harvest; plant population too high; header too high	Plant adapted va as mature; use f soybean guards o
Stubble losses	Header too high	Use floating hea cutter bar, but ground
Cylinder and separator losses	Improper groundspeed or cylinder speed; improper cylinder and air adjustments	Keep groundspeed overloading cyli for cylinder and changing humidity for slipping driv and shoe to oper

Source: EA9087 A Guide for Measuring Soybean Harvest Loss, The Ohio State University.

SOURCES OF SOYBEAN HARVESTING LOSSES

Possible Causes	Corrective measures
Delayed harvest, lodging and shattering	Harvest as soon as 15% moisture is reached. Plant lodge-and shatter-resistant varieties
High groundspeed; low reel speed; over-dry beans; reel too high	Maintain 2.5 to 3 mph groundspeed. Keep reel 15 to 20 in. above ground, and run 25 to 50% faster than groundspeed. Keep reel axle 6 to 12 in. ahead of cutter bar; make sure reel drive is not slipping
Reel too slow; groundspeed too slow; reel too high; reel axle behind cutter bar	Determine and maintain proper speeds; reset reel to fit conditions
Delayed harvest; plant population too high; header too high	Plant adapted varieties; harvest as soon as mature; use floating header or special soybean guards on cutter bar
Header too high	Use floating header or special shoe on cutter bar, but keep bar within 2½ in. of ground
Improper groundspeed or cylinder speed; improper cylinder and air adjustments	Keep groundspeed under 3 mph to prevent overloading cylinder. Determine best setting for cylinder and separator; alter to fit changing humidity as day progresses; watch for slipping drive belts permitting rack and shoe to operate too slowly

uide for Measuring Soybean Harvest Loss, The Ohio State University.

LOSS DATA WORKSHEET

Source of Loss	Column A Beans Found in 10 Sq. Ft. Area	Number of Beans = To 1 Bu. /Acre	Column B Your Bean Loss in Bu. /Acre	Column C Acceptable Loss Level in 40 Bu. /Acre Yield
1. Total Crop Loss		40		1.3
2. Pre-Harvest Loss		40		0.1
3. Machine Loss		40		1.2
4. Gathering Unit Loss Totals of:		40		1.1
a. Shatter		40		0.4
b. Loose Stalk		40		0.2
c. Lodged Stalk		40		0.2
d. Stubble		40		0.3
5. Cylinder and Separation Loss				0.1

Source: Bul. EA-9087 by Delbert M. Byg, Extension Agricultural Engineer, The Ohio State University

I. An average of 4 beans per square foot equals about 1 bushel per acre loss.

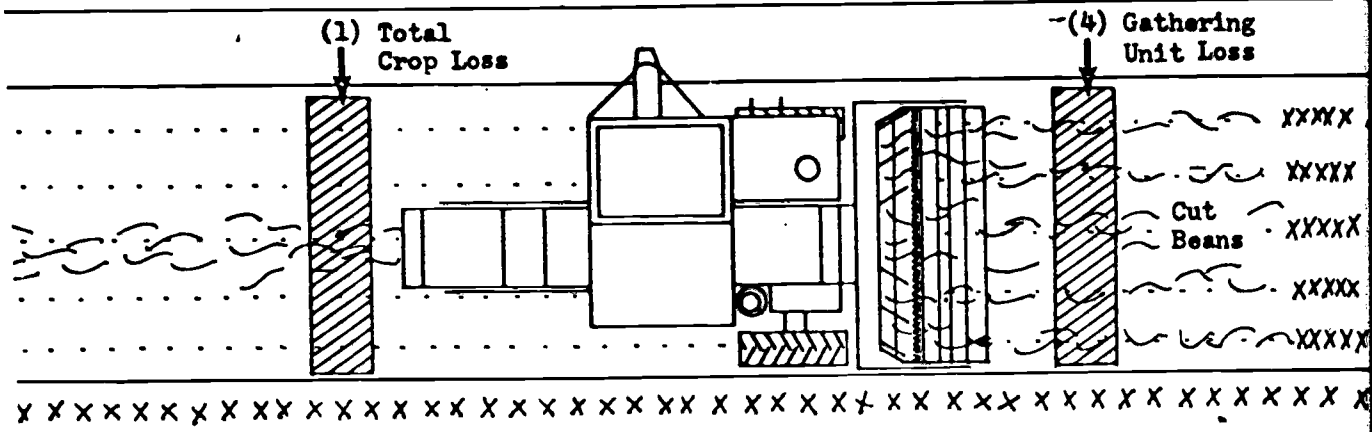
II. Construct a rectangular frame that encloses an area of 10 sq. ft. and is equal in width to the combine header. See Table 1. A plastic clothesline taped to 4 wire pins made of #9 wire makes a handy measuring frame.

III. Place the rectangular frame across the machine swath as shown in sketch below and make loss counts for:

Table

Dimensions For Rec

Header Width (Ft.)
8'
10'
12'
13'
14'



Procedure

1. Stop combine at least 300 feet in from ends of field and where crop is typical of entire field. Back up combine about 15 feet. Place rectangular frame across swath harvested at rear of combine. Count all beans in frame and enter this count in loss data table column 1-A. Divide this number by 40 and enter the loss in bushels per acre in column 1-B. If loss is near 3% of yield, keep right on harvesting. If loss is greater, then proceed to pinpoint the sources of loss.

2. Determine pre-harvest loss by placing rectangular frame in standing beans in front of combine. Count loose beans on ground and beans in pods laying loose on ground. Enter this number in column 2-A and then divide by 40 to get loss in bushels per acre. Enter this loss in column 2-B.

3. Machine loss is determined by subtracting the pre-harvest loss from the total crop loss. If machine loss is near 3 percent of yield or less, keep right on harvesting. If more, then proceed to check gathering unit losses.

4. Gathering unit losses are determined by placing the rectangular frame in the space between the parked combine and the standing beans. Then proceed to make bean counts as follows:

   (a) Shatter loss—count all loss beans on g
   Enter this number in column 4 a—A a
   4 a—B.

   (b) Loose stalk loss—count all beans in
   cut but not gathered into machine. Ent
   bushel per acre loss in column 4 b—B

   (c) Lodged stalk loss—count all beans in
   lodged and are still attached to the g
   A and enter bushel per acre loss in c

   (d) Stubble loss—count all beans in pods
   in column 4 d—A and enter bushel p

   Total gathering unit loss is now obtained by
   stubble, loose stalk and lodged stalk losses

5. Cylinder and separation loss is now determ
   from the machine loss. Enter this difference

Note: Now compare your harvest loss levels t
machine adjustments and operating pr
Repeating these loss checks in differ
their accuracy.

SOURCE: EA9087 A Guide for Measuring Soybean Loss, The Ohio State University.

square foot equals about 1 bushel per acre loss.

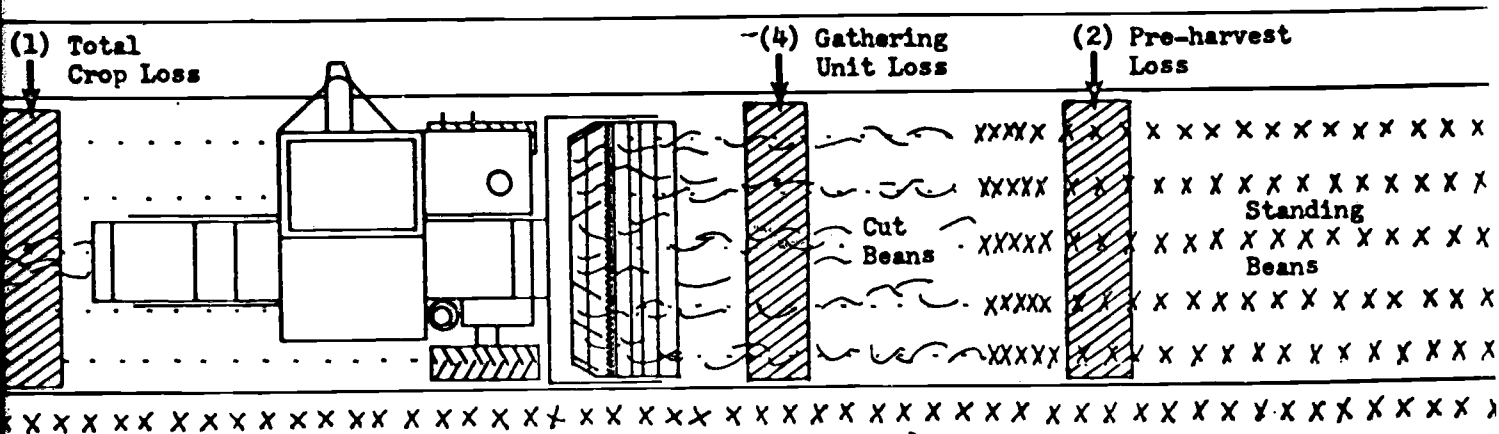
ne that encloses an area of 10 sq. ft. and is equal in width Table 1. A plastic clothesline taped to 4 wire pins made measuring frame.

across the machine swath as shown in sketch below and

Table 1

Dimensions For Rectangular Frame

Header Width (Ft.)	Frame Length (In.)
8'	15"
10'	12"
12'	10"
13'	9.25"
14'	8.6"



et in from ends of field and, where crop is typical of entire t 15 feet. Place rectangular frame across swath harvested ll beans in frame and enter this count in loss data table ber by 40 and enter the loss in bushels per acre in column ld, keep right on harvesting. If loss is greater, then proceed ss.

by placing rectangular frame in standing beans in front of s on ground and beans in pods laying loose on ground. 2-A and then divide by 40 to get loss in bushels per acre. B.

by subtracting the pre-harvest loss from the total crop loss. ercent of yield or less, keep right on harvesting. If more, ering unit losses.

etermined by placing the rectangular frame in the space and the standing beans. Then proceed to make bean counts

(a) Shatter loss—count all loss beans on ground and beans in loose pods on ground. Enter this number in column 4 a—A and enter bushels per acre loss in column 4 a—B.

(b) Loose stalk loss—count all beans in pods attached to soybean stalks that were cut but not gathered into machine. Enter this number in column 4 b—A and enter bushel per acre loss in column 4 b—B.

(c) Lodged stalk loss—count all beans in pods attached to soybean stalks that were lodged and are still attached to the ground. Enter this number in column 4 c—A and enter bushel per acre loss in column 4 c—B.

(d) Stubble loss—count all beans in pods still attached to stubble. Enter this number in column 4 d—A and enter bushel per acre loss in column 4 d—B.

Total gathering unit loss is now obtained by adding the losses in column B for shatter, stubble, loose stalk and lodged stalk losses. Enter this number in column 4-B.

5. Cylinder and separation loss is now determined by subtracting the gathering unit loss from the machine loss. Enter this difference in column 5-B.

Note: Now compare your harvest loss levels to those in column C. Then concentrate on machine adjustments and operating practices that will give the least total loss. Repeating these loss checks in different parts of the field will greatly increase their accuracy.

Guide for Measuring Soybean Loss, The Ohio State University. Adult 105-9-4

TIPS FOR KEEPING COMBINE LOSSES LOW

Remember that more than 80 percent of the machine loss occurs at the gathering unit. The following suggestions will help keep these losses to a minimum.

1. Make sure that knife sections, guards, wear plates and hold-down clips are in good condition and properly adjusted.

2. Keep seedbed level! Do not earth-up soil around beans when cultivating.

3. Operate the cutterbar as close to the ground as possible at all times.

4. Use a ground speed of 2.8 to 3.0 miles per hour. To determine ground speed, count the number of 3 ft. steps taken in 20 seconds while walking beside the combine. Divide this number by 10 to get the ground speed in miles per hour.

5. Use a reel speed about 25 percent faster than ground speed, or for 42 inch diameter reels, use a reel speed of 11 r.p.m. for each 1 mile per hour ground speed.

6. Reel axle should be 6 to 12 inches ahead of cutterbar. Reel bats should leave beans just as they are cut. Reel depth should be just enough to control the beans.

7. A 6 bat reel will give more uniform feeding.

Source: Bul. EA-9087 By Delbert M. Byg, Extension Agricultural Engineer, The Ohio State University

Adult 105-9-5

Lesson 10

MARKETING SOYBEANS

Objective -- To develop the effective ability of farmers to profitably market soybeans.

Problem and Analysis -- How can we market soybeans most profitably?

-Potentials and alternatives
-Basis for hedging
-Grades and grading

Content Information

I. General rules of marketing.

A. The following are general rules concerning soybean prices as set forth by Dr. T. A. Hieronymus, University of Illinois:

1. When conditions of supply and price are the same as the preceding year, it is best to hold for a price rise.
2. The price of a comparatively short crop usually peaks early.
3. The price of oil is sensitive to the world supply-and-demand situation and tends to move in long cycles. All other things being equal, the price of soybeans moves in the direction of oil prices.
4. The price of meal is sensitive to change in livestock numbers, particularly hogs. Growers should hold soybeans when an increase in the spring pig crop is anticipated.
5. Meal consumption is responsive to price. A high price for meal in the fall and winter often results in a decreasing price in spring and summer, and vice versa.
6. The price of soybeans is responsive to general inflation-deflation conditions and moves in general sympathy with the prices of other commodities. It is also very sensitive to news of international unrest.
7. Speculative activity in both cash and futures by farmers and others is very important in determining the seasonal pattern of soybean prices. There is a tendency to put the price either too high or too low at harvest and a tendency to remember only last year. This yields an every-other-year flavor to soybean holding. Thus the most profitable procedure might well be to do what would have been unprofitable the year before.

B. It should be pointed out that these rules were developed when both production and demand were increasing and there was no appreciable supply at the end of the season. Their accuracy for the future is yet to be confirmed.

II. Potentials and Alternatives

A. On-farm storage gives you control of price, but brings on problems of storage management. Once delivered to an elevator, price is determined.

B. In 1972, you could have made money by selling beans at a given price, buying futures and selling when the prices go up, thus preventing losses due to storage, etc.

C. A.S.C. loans also give a hedging capability through on-farm storage.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Types of markets available; services provided.
2. Cost of storage and conditions when it is most profitable to store.
3. Factors affecting price.
4. Grades and requirements of soybeans.
5. Definition and means of hedging, futures contacts.
6. Relationship between livestock prices and soybeans prices.

B. Things to get from class members:
1. Local market types.
2. Time of marketing locally and how the decision is made.
3. Local and area prices.
4. Observations of grades and grading done locally.

II. Conclusions

A. Investigate alternatives in marketing — field to elevator, on-farm storage, government loans with on-farm storage -- and hedge on futures market.

B. Maintain quality in beans for top prices. Shoot for top grade.

C. Consider certified seed beans for a premium of 50 to 60 cents per bushel.

III. Enrichment Activities

A. Visit the local soybean market to determine services performed and observe business procedures.

B. Collect and display samples of various grades of soybeans.

C. Invite a commodity individual to discuss futures, hedging, etc. as a tool of marketing.

D. Secure prices of soybeans and set up a graph to show daily prices. (This is a local-markets basis of futures trading.)

IV. Suggested Teaching Materials

A. References
1. In packet
a. Soybean Futures, Chicago Board of Trade.
b. When to Sell Corn, Soybeans, Oats and Wheat, Illinois Circular 948.
2. Additional references
a. Hedging Highlights, Chicago Board of Trade.
b. Marketing Grain Through a Grain Exchange, Chicago Board of Trade.
c. Grain Merchandising and Futures Markets in Kentucky, by Steve A. Callahan, University of Kentucky Ag Extension Series No. 7.
d. Modern Soybean Production by Scott & Aldrich, Chapter 8.

B. Audio-visuals
1. Filmstrips
a. "Hedging", Chicago Board of Trade.
b. "Factors Affecting Classes and Grades of Soybeans," Illinois VAS 746.
2. Masters
-1 Value of U. S. Exports
-2 Value of U.S. Soybean Exports

Value of selected U. S. domestic exports, agricultural and non-agricultural, 1964-70

Commodity	1964	1965	1966	1967	1968	1969	1970
	Millions of dollars						
Soybeans	564	650	760	722	810	822	1,216
Soybean oilcake and meal	134	169	212	235	249	270	344
Soybean oil	140	162	125	143	97	95	192
Total	841	981	1,097	1,150	1,156	1,187	1,752
Feed grains	924	1,208	1,424	1,155	1,014	948	1,170
Wheat and flour	1,531	1,185	1,536	1,207	1,101	831	1,112
New motor vehicles	760	762	1,017	1,276	1,464	1,612	1,434
Civilian aircraft	287	478	553	790	1,405	1,266	1,529
Total of above items	4,343	4,614	5,627	5,578	6,104	5,844	6,997
Total U. S. Exports	26,297	27,178	29,994	31,238	34,199	37,462	42,593

Overseas Business Reports, Bureau of International Commerce, U. S. Department of Commerce, OBR 71-099, February 1971.

SOURCE: ESC-570 "Soybean Demand Around the World"

Value of U. S. soybean and soybean product exports, 1968-70

Country of destination	1968	1969	1970
	Thousands of dollars		
United Kingdom	18,451	15,855	23,105
European Community	423,857	437,805	559,310
Spain	83,956	93,550	101,128
India	26,684	24,022	27,424
Taiwan	31,573	46,014	53,350
Japan	206,410	193,993	257,213
Other	319,680	316,385	500,618
Total	1,110,611	1,127,724	1,522,148

Source: *Foreign Agricultural Trade of the United States,* Supplements, Annual Issues, 1968, 1969, 1970, Economic Research Service, USDA.

SOURCE: ESC-570 "Soybean Demand Around the World"

Lesson 11

USING PRODUCTION RECORDS

Objective -- To develop the effective ability of farmers to use production records for improving the profitability of the soybean enterprise.

Problem and Analysis -- How can production records be used to increase profit with soybeans?

-Analyzing records
-Interpreting results
-Determining profits
-Setting new goals

Content Information

I. Low yields are partially the result of soybeans being the "second" crop on a number of farms. As such they have not been given the total "management package" which corn growers know is so important. Too many farmers have considered soybeans as a low-direct-cash-input crop over the years, spending about $10 to $20 per acre, while top growers are investing well over $30 per acre, are averaging about 50 bushels per acre, and their returns are nearly $100 per acre.

II. The management packages of growers differ widely -- seeding rate, fertilizer and lime applications, herbicides, and pesticide programs all vary widely, so the individual soybean grower must experiment if he is to find the best package for his farm. Machinery and equipment costs usually range from $12 to $20 per acre across the country, and costs for growing are typically greater than harvesting and hauling. However, figured on the basis of custom rates, some top operators had costs over $30 per acre, while several were as low as $10 per acre.

III. Labor costs to produce an acre of soybeans will vary with the price of labor in the community. Hours of labor per acre vary in the range of three to six hours. Labor may not be a cash input, but it should be included in a cost-of-production budget with a reasonable value attached so one can compare soybean costs with other crops.

IV. Land charges vary by area and quality of land. The range, according to farm records, was from $13 to $26 per acre for taxes, insurance, and interest on investment. Adding all these inputs gives us a total cost per acre for soybeans of from $40 to $70, or about $15 to $20 less than for corn. But good soybean growers, those who treat soybeans as a "first" crop, will be spending considerably more in the near future. Many top soybean producers have over $50 per acre in direct cash and equipment costs. Adding land and labor puts them up around $90 total cost per acre, shattering the theory that soybeans are a low-direct-cash-input crop.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
1. Comment on results that were obtained from the modification or adoption of new practices.
2. Relate these results with results obtained in experimental studies and local demonstration plots.
3. Possible new goals (yields, net return) for the community.
4. Suggested plans to achieve these goals.

B. Things to be brought out by class members:
1. Their results: yield, return per acre, cost and return per bushel.
2. Assessment of promising new practices (those most economical in cost and return).
3. Comparison of soybeans on each farm compared with return for ther crops.
4. Which practices need more attention next year.

II. Conclusions

A. Each farmer should keep a pocket memo pad to record information observed during the growing season (climatic conditions, operations, applications, crop reaction, etc.).

B. Use cost return guidelines of area soybean producers to compare with your records to determine operating changes needed and new goals to be set.

C. Use the following guideline to justify growing beans over corn: $\frac{\text{Yield in bushels of corn X price}}{\text{\$3 per bushel of beans}}$ = bushel of beans required

D. You need good records to make sound decisions.

III. Enrichment Activities

A. Set up an "approved practices for soybean production" work sheet:
   1. Keep records.
   2. Test soil and apply fertilizer.
   3. Select seed.
   4. Plant properly
   5. Cultivate efficiently.
   6. Control diseases and insects.
   7. Harvest and store properly.
   8. Study results.

B. Have class members complete their individual records for soybean production. Compute total income, total cost, net income, returns per acre or bushel, and returns for management.

C. During the summer, conduct a tour of farms and demonstration plots in the community to observe and discuss new practices being used.

D. During individual on-the-job instruction, assist each enrollee in interpreting his records and formulating goals for future production.

IV. Suggested Teaching Materials

A. References
   1. In packet
      a. Modern Soybean Production, Amchem Products.
      b. Approved Practices for Soybeans, Illinois VAS.
      c. Standards for Measures of Efficiency.
      d. Custom Rates and Machinery Rental Rates for Illinois, Illinois FM8B.
   2. Additional references
      a. Farm Planning Manual for Kentucky Farmers, University of Kentucky, March, 1970.
      b. Farm Analysis Group Summary, University of Kentucky, 1965-present.
      c. Corn and Small Grain Harvesting Costs, Ky. Circular 558.

B. Audio-visuals
   1. Masters
      -1 Production Costs in Other States
      -2 Production Practices
      -3 Yield, Costs and Returns

SOYBEAN PRODUCTION COSTS -- OTHER STATES

Costs	Illinois	Iowa	Arkansas (Northeast)	Missouri (North Central)	Minnesota	North Carolina	Oklahoma (Irrigated)
Direct cash							
Seed	$ 4.00	$ 4.00	$ 4.95	$ 3.37	$ 4.00	$ 3.22	$ 6.65
Fertilizer	1.64	5.20	-	9.59	4.25	12.00	-
Pesticides	3.50	4.00	2.44	5.29	4.00	.54	6.38
TOTAL	$ 9.14	$13.20	$ 7.39	$18.25	$12.25	$15.76	$13.03
Equipment							
Growing	$ -	$ 9.00	$ 7.98	$ -	$ -	$ 6.50	$12.04
Harvesting	-	5.00	5.19	-	-	9.21	9.20
TOTAL	$11.13	$14.00	$13.17	$14.84	$12.00	$15.71	$21.24
Labor							
Growing	$ -	$ 3.40	$ 4.65	$ -	$ -	$ -	$ -
Harvesting	-	1.05	1.95	-	-	-	-
Indirect	-	1.80	-	-	-	-	-
TOTAL	$ 7.90	$ 6.25	$6.60	$ 4.05	$ 8.25	$ 7.50	$ 6.45
Land							
Taxes	$ -	$ 8.50	$ 1.00	$ 5.00	$ 4.50	$ 3.00	$ 1.00
Interest	-	21.25	12.00	25.00	19.00	15.00	19.00
TOTAL	$26.76	$29.75	$13.00	$30.00	$23.50	$18.00	$20.00
TOTAL COST PER ACRE	$54.93	$63.20	$40.16	$67.14	$56.00	$56.97	$89.96*
YIELD (bushels)	35	32	30	35	25	37	40
COST PER BUSHEL	$ 1.55	$ 1.98	$ 1.34	$ 1.92	$ 2.24	$1.54	$ 2.25

*Includes $18.64 direct cash inputs for irrigation and $10.60 fixed irrigation costs.

Source: Delta Farmer Magazine

Adult 105-11-1

PRODUCTION PRACTICES FOR SOYBEANS IN LOUISIANA, 1970[1]

	Yield group		
	Low	Medium	High
	--------- Percent ---------		
Heavy soil type	78.1	70.2	50.5
Very good surface drainage	6.7	9.6	25.7
Very good subsurface drainage	00.0	4.8	3.7
Land forming practices	7.6	15.4	29.3
Liming	12.4	34.6	22.9
Fall plowing	72.4	73.1	91.8
Deep tillage	48.6	55.8	64.2
Planting on a bed	38.1	51.0	50.5
Planting on 40-inch rows	50.5	37.5	57.8
Completed planting by May 31	59.4	86.5	85.3
Double-disc opener planter	51.4	38.5	46.8
Sword-type planter	48.6	61.5	53.2
Use of pre-emergence herbicides	74.3	81.7	80.7
Four cultivations	27.6	41.3	31.2
Use of post-emergence herbicides	40.0	43.3	41.3
Hand hoeing	32.4	50.0	57.8
Flame cultivation	3.8	7.7	4.6
Use of lay-by herbicides	10.5	13.5	5.5
Complete weed control program	9.5	17.3	21.1
Fields free of weeds	25.7	37.5	59.6
Use of insecticides	33.3	39.4	22.0
Average or better weather conditions	10.5	37.2	53.2

[1]Average number of acres of soybeans planted were 597.4, 815.4 and 637.6, respectively, for the low, medium and high yield groups.

Source: Delta Farmer Magazine

YIELDS, COSTS AND RETURNS PER ACRE FOR SOYBEANS IN THE MISSISSIPPI RIVER DELTA AREA, LOUISIANA, 1970

Item		Yield group		
		Low	Medium	High
---------- Four-row and Six-row Equipment ----------				
Yield:				
Soybeans	bushel	20.3	29.8	38.5
Income:				
Soybeans	dollars	55.01	81.95	106.65
---------- Four-row Equipment ----------				
Specified Costs:				
Land preparation	dollars	9.91	11.09	9.78
Planting	dollars	5.21	5.11	5.24
Weed Control	dollars	8.34	8.66	11.76
Harvest	dollars	7.27	8.22	9.09
Total		30.73	33.08	35.87
Returns to Land and Management:				
Returns	dollars	24.28	48.87	70.78
---------- Six-row Equipment ----------				
Specified Costs:				
Land Preparation	dollars	8.31	9.33	8.27
Planting	dollars	4.62	4.58	4.72
Weed Control	dollars	7.49	7.96	11.22
Harvest	dollars	6.20	7.15	8.02
Total		26.62	29.02	32.23
Returns to Land and Management:				
Returns	dollars	28.39	52.93	74.42

Source: Delta Farmer Magazine

Lesson 12

UTILIZING NEW DEVELOPMENTS

Objective -- To develop the effective ability of farmers to utilize new developments in soybean production.

Problem and Analysis -- How can we best utilize new developments in soybean production?

-Identifying new uses of soybeans
-Sources of new information
-Potentials for varieties and hybrids
-Use of growth regulators

Content Information

A. Soybeans are now our number two cash crop in the United States. Production has increased from 83 million bushels in 1955 to 3.6 billion bushels in 1971. This is an increase of 335 per cent in the past 7 years.

B. Exports to Japan in 1956 were 20 million bushels as compared to 110 million bushels in 1971. The European Common Market and Near East are also large recipients of our export trade. This means that, going into the 1970's, 50 per cent of our domestic crop is being exported in beans, oil and meal. To meet this demand growers must produce 26.5 bushels per acre to break even, based on a price of $3 per bushel, and a production cost of $2.48 per bushel.

C. There are two types of soybean plants:
   1. Determinant, which makes practically all its vegetative growth before flowering and pod set. (Grown mostly in the South and Delta area.)
   2. Non-determinant, which starts flowering and pod set before completing vegetative growth. (This is the type grown in Kentucky.)

D. T.I.B.A. or "Regim 8" (trade name) is a hormone type of spray that is applied for the purpose of creating more flower sets on the soybean plant. Iowa studies indicate that this practice may increase yields some 4 to 5 bushels per acre if properly applied at the correct stage of plant growth (at the development of the fifth trifoliate leaf). Timing is essential, as there is only about a 3 to 4 day span of optimum application. T.I.B.A. applied at the 4 oz. rate would cost about $3.50 per acre. Seasonal conditions and the "discomfort index" of the soybean plant are all important for the performance of "Regim 8".

. Workers at the Stoneville, Mississippi, USDA Center are giving priority to new varieties with built-in resistance to disease and chemical tolerances. Hybrids seem at this time (going into the 70's) to offer significantly higher yields. Researchers feel that it will be several years before the hybrid system can become a reality. The present work at this station is homed-in on building specific characteristics into new strains, such as resistance to cyst nematodes, especially "Race 4".

F. There is no shortcut to sustained, profitable soybean yields. The interval between planting and harvesting is usually where the profit margin is decided on soybeans. The successful soybean producers of the future will use these ten steps to high soybean yields:
   1. Adapt and combine the out-puts of research to his own conditions.
   2. Select only those soils with structure and tilth most suitable for soybean production.
   3. Check fertility and lime status before the crop is planted, using complete soil tests.
   4. Always purchase certified, disease-treated seed.
   5. Always inoculate seed.
   6. Use only the highest yielding varieties, which mature in the local, normal growing season.
   7. Prepare an adequate seedbed and follow with precision planting.
   8. Follow recommended practices for disease, insect and weed control.
   9. Make frequent field inspections to determine crop status.
   10. Harvest only with properly adjusted and mechanically sound equipment.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. Reasons for increases in soybean production.
   2. Major products made from soybeans.
   3. Emerging uses and markets.
   4. Information on growth regulators (types, use, value).
   5. Hybridization process as applied to soybeans.
   6. New developments in cultural, marketing methods.

B. Things to be brought out by class members:
   1. New methods they have observed or heard about.
   2. Sources of information available on recommended and emerging practices and developments in soybean production.
   3. Ideas as to steps and procedures for improved profits in soybeans.

II. Conclusions

A. There are no shortcuts to soybean yields.

B. Research is constantly defining new uses of soybeans in food, fiber and plastics. Soybeans are our best hope for meeting the world's need for protein.

C. All soybean producers should be members of the American Soybean Association. Dues of $10 a year provide many benefits -- including keeping up-to-date on new developments, promotions, etc.

D. Subscribe to the Delta Farmer for the latest in information on soybeans under conditions similar to those found in west Kentucky.

E. Consult the leading institutions on soybean research -- Iowa State University, University of Illinois, USDA Soybean Center at Stoneville, Mississippi -- for new data on soybean production and marketing.

F. A sound management package adapted to each grower's farm will give increased yields of 10-20 bushels per acre and more.

G. Growth regulators are not regarded as economically feasible, year in and year out. If used, timing is essential.

H. Disease resistance is currently being given priority over hybrid development in soybean research.

III. Enrichment Activities

A. A pleasant and informative evening is possible by inviting a representative of a soybean processing plant to discuss their function in the role of the soybean. To whom do they ship their products and what are the final products of their customers?

B. If possible schedule the State ASA president to address the group on uses of soybeans, especially expansion of foreign markets.

C. A week before this session divide the class into committees and as they visit businesses in the community have them make a list of products that contain soybeans in some form.

D. Again divide the class into committees and have each develop a list of sources of information pertaining to recommended and emerging practices and developments in soybean production.

E. Have each class member develop a list of approved practices to follow for profitable soybean production.

IV. Suggested Teaching Materials

A. References
1. In packet
   a. Hybrid Soybeans in the Future, Illinois Agronomy Facts S-13.
   b. When to Sell Corn, Soybeans, Oats and Wheat, Illinois Circular 948.
   c. Soybean Farming, National Soybean Crop Improvement Council.
   d. Modern Soybean Production, Amchem Products, Inc.
   e. Soybean Yields Can Be Increased, Iowa Pub., FS-1209.
2. Additional references
   a. Dessicants for Drying Weeds in Soybeans, Illinois Agronomy News, No. 379.
   b. Production Potentials for Kentucky Agriculture, Ky. Misc. 327.
   c. Modern Soybean Production by Scott and Aldrich, Chapter 9.

B. Audio-visuals
1. Trasparency master
   -1. Major Barriers to Top Soybean Yields

MAJOR BARRIERS TO TOP SOYBEAN YIELDS

Genetic limits - a result of old agriculture (China)

Uncontrolled plant population - balance with technology

Ineffective nodules - superior rhizobia

Soil moisture - total distribution

Fertility - a high demand crop

Weeds - compete for nutrients, moisture, light

Diseases - leaf = poor vigor, shoot = lower yield

Insects - destroy seed and reduce quality

APPENDIX

MY TEACHING PLAN FOR THIS COURSE

Why I am teaching this course (major learnings or outcomes expected)

ARRANGEMENTS FOR THE COURSE

Session No.	Date	Topic	Clock Hours

This page is for your convenience in planning and rearranging the content of this course to meet local needs and interests. Plan the course as it will be taught in the local school, showing the dates, class session number, topics, and the time in hours allocated to each topic.

TOPIC PLANNING FOR THIS COURSE

Name of Course _____

Name of Topic _____

Number of Class Meetings Allotted for this Topic _____

Teaching Objectives: (Learnings or outcomes for those enrolled)

Major Phases of the Topic: (Problems, jobs, areas, skills, key points, understandings, etc.)

Learning Activities: (Field trips, completing summary forms, panel discussions, demonstrations, etc.)

Teaching Materials Needed: (From resource material list or file)

RESOURCE MATERIALS FOR TEACHING

Unit _____ Lesson _____

Reference Books	Date Used	File Location

Other References: Bulletins, Magazines, Etc.

Audio-Visuals: Slides, Filmstrips, Motion Pictures

Magnetic, Flannel, and Bulletin Boards

Charts, Maps, Posters

Transparencies

Specimens, Models, Mounts

Human and Community Resources

Please complete and return to:
Maynard J. Iverson
7 Dickey Hall
University of Kentucky
Lexington, Kentucky 40506

ADULT INSTRUCTIONAL UNIT EVALUATION

-- A Questionnaire for Kentucky VoAg Teachers of Adults

PART I -- GENERAL INFORMATION

How many years of teaching experience do you have? _____

How many years have you taught adults in agriculture? _____

How long has it been since you have taken your last college classwork in agriculture_____; in education _____; (undergraduate, graduate, or non-credit course)? _____

What is the highest degree you hold? _____

How many teachers are in your department?_____

What age level students do you teach? (✓one)
a) ____high school and adult b)_____adult only

How many other units from the University of Kentucky have you used in your teaching during the past few years?_____

PART II -- UNIT INFORMATION

NAME OF UNIT EVALUATED:_____

TYPE OF CLIENTELE TAUGHT: _____Adult Farmer ____Young Farmer
_____Other Adults (please specify)_____

Average number attending class _____

Was the interest level _____high? _____moderate? _____low?

How many lessons did you use?_____ How many class periods?_____

Indicate any lesson you added or deleted_____

_____

_____

_____

Directions: Place a check mark (✓) in the appropriate left hand column to rate the following components of the unit based on your own observations. A ranking of 5 represents an excellent rating decreasing to a rank of 1 for poor. For the open-ended questions please write on the back if additional space is needed.

Unit Design

5	4	3	2	1	
					General arrangement of parts
					Appropriateness of format for teaching adults
					Length of the unit
					Usefulness of suggestions for using the unit
					Number of lessons
					Order of lessons

Specific comments:_____

_____

PLEASE CONTINUE ON NEXT PAGE

Objectives in the Unit

5 4 3 2 1

_____ Clearly stated
_____ Reasonable to reach in the allotted time
_____ Relevant to needs of the adult learner
Specific comments: _____

Technical Content

5 4 3 2 1

_____ Usefulness of introductory material
_____ Sufficiently detailed for direct use in class
_____ Related to objectives
_____ Divided into appropriate problem areas
_____ Up-to-date
_____ Accuracy
_____ Reasonably complete
Specific comments: _____

Suggestions for Teaching the Lessons

5 4 3 2 1

_____ Appropriate information for the teacher to bring out
_____ Appropriate items to be secured from class members
_____ Suitable conclusions
_____ Suitability of enrichment activities
Specific comments: _____

Resources and Teaching Aids in the Unit

5 4 3 2 1

_____ Up-to-date
_____ Accessibility to the teacher
_____ Relevance to the unit
_____ Adaptability to the teaching plan
Specific comments: _____

With what parts of the unit do you feel you need additional help?

____ None of them
____ Objectives
____ Content
____ Course organization and planning
____ References
____ Resources and teaching materials
____ Teaching methods
____ Other (Specify) _____

PART III -- GENERAL REACTION

Please indicate any other strengths and weaknesses that you have observed in the unit and any suggestions for improvement, revision, and/or implementation (use the back of this sheet if needed).